

Series 2

User Manual

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SERIES TWO MANUAL

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SECTION 1 (a)

INTRODUCTION

The Soundcraft Series Two range of mixers have evolved to their present very comprehensive format from the original flat packaged 12/4 mixer, released in June 1974.

The design concept behind the present range of mixers is to offer as flexible a system as possible, whilst maintaining a very high standard of electronic performance, and by using various techniques of construction to keep the overall cost as low as possible.

It was decided to use a semi-modular form of construction to avoid the excessive cost of a fully-modular approach, but to build in such a way as to allow very fast changing of individual circuit boards without any need to solder.

Use of the mixer, and further reading of this manual, will confirm that these criteria have been fully met.

SECTION 1.

(b) Studio Installation.

(i) Grounding unbalanced equipment:

The simplest technique is to earth the mixer and un-earth all external equipment, letting the screen carry the earth out from the console. Alternatively, connect the screen at the mixer end only, and bring a thick wire back from the external unit to the console earth. This method has the advantage of keeping the external unit always grounded, avoiding cracks and thumps when making a first connection to it from the console.

(ii) Grounding balanced equipment:

Series Two consoles are normally unbalanced, but good advantage may be made of external balanced equipment by connecting the console live to external live and console ground (screen) to external neutral, with no connection to ground. The external unit may now be earthed at any point to prevent the chassis from floating all over the place - electrically that is.

An excellent article on grounding and other inter-connection problems appeared in Studio Sound, April 1977 (page 32), written by Dave Dearden.

(iii) Inter-connections:

The following connections should be made:-

<u>Console:</u>		<u>External equipment:</u>
1. Group outputs	to	Multi-track inputs.
2. Tape inputs	"	Multi-track outputs.
3. Cue outputs 1 & 2	"	Studio headphone amp inputs.
4. Cue outputs 3 & 4	"	Reverb or Echo inputs.
5. Echo returns 1 & 2 or spare line inputs	"	Reverb or Echo outputs.
6. Remix left and right	"	Master 2-track inputs.
7. Replay left and right	"	Master 2-track outputs.

3, 4 and 5 are suggestions, and may be altered to best suit a given situation. During mix-down, headphone feed to the studio is generally not required, so cues 1 & 2 may be used as additional sends to phasing units, digital delays, etc. and returned through any spare line inputs or echo returns 1 & 2.

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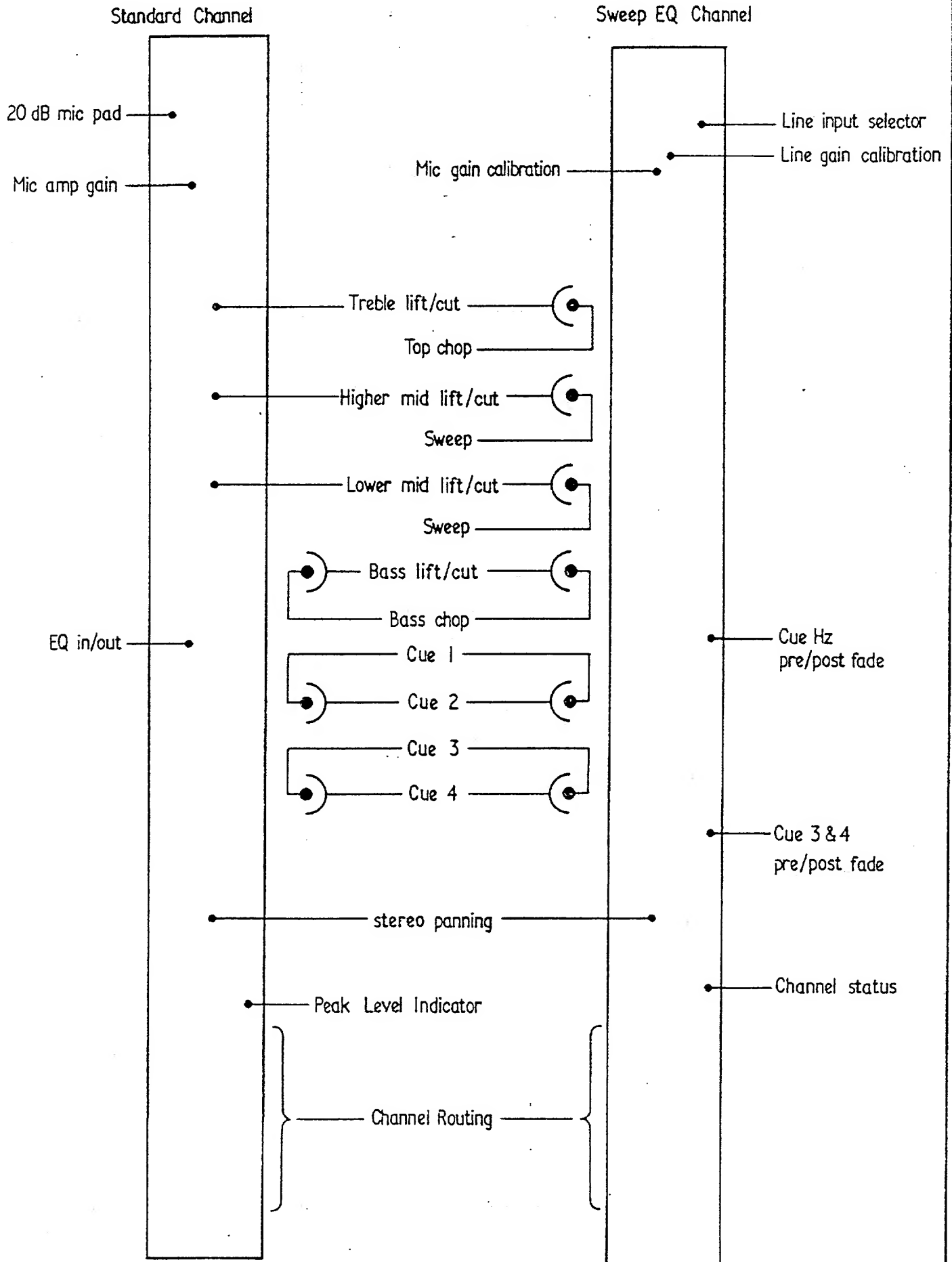
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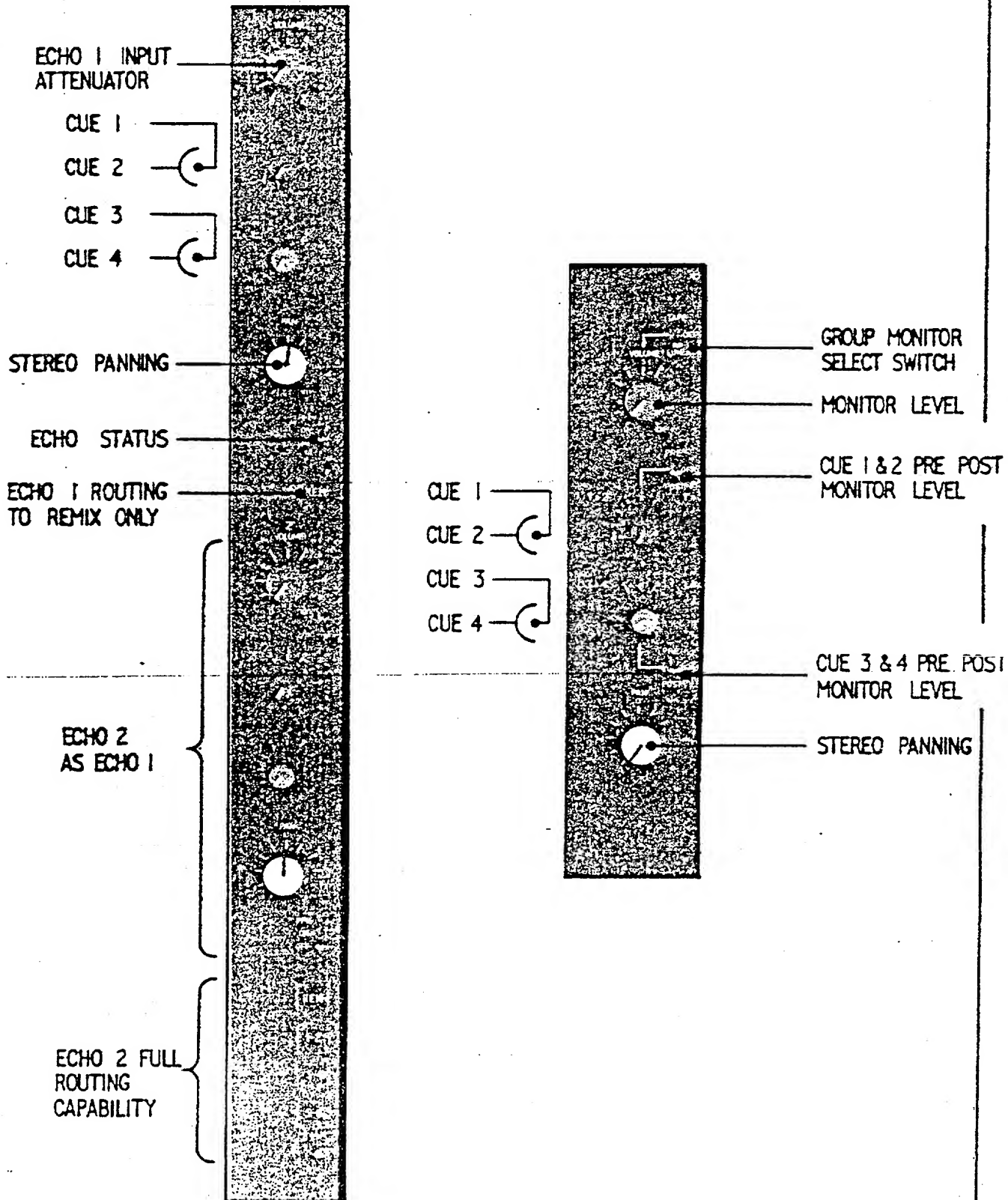
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SERIES II INPUT CHANNEL DETAIL



SERIES II ECHO CHANNEL & GROUP MONITOR DETAILS



SERIES II MONITOR & CUE MASTER DETAILS

TALKBACK MIC
CONNECTOR

INTERNAL OSCILATOR
FREQUENCY SELECT

INTERNAL OSCILATOR LEVEL

OSCILATOR STATUS

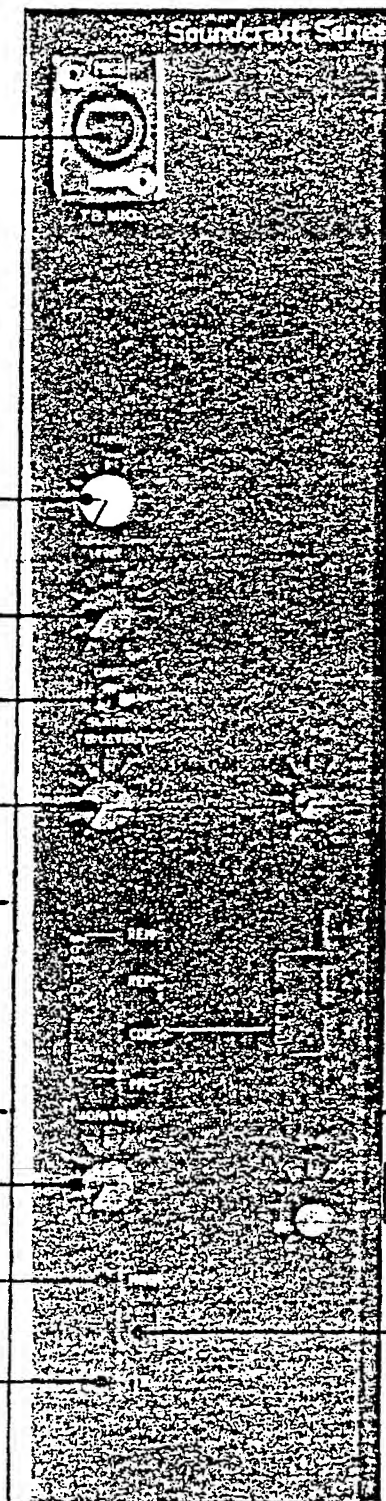
TALKBACK LEVEL
ON SLATE BUSS

SELECTS MONITOR
SOURCE

MONITOR LEVEL POT
ADJUSTS LEVEL TO
HEADPHONE SOCKET &
CONTROL ROOM AMPS.

COMBINES MONITOR
LEFT & RIGHT OUTPUTS.

SELECTS T.B. MIC TO
SLATE BUSS & AUTOMATICALLY
ACTIVATES DIM. SWITCH.



CUE 1 MASTER

CUE 2 MASTER

CUE 3 MASTER

CUE 4 MASTER

SELECTS ANY OR ALL CUES
TO MONITORS AND PFL.

CUTS MONITOR OUTPUT
BY 20dB

SECTION 1. (cont.)

(c) Studio Operation - the recording process.

(i) Recording the initial tracks:

Channels may be selected to any group by use of the routing switches and the pan control. Any channel or group in use should have their faders at approx. the 0 dB line. This optimises headroom throughout the console, so that if an individual channel tended towards overload level, the group to which it was assigned would have a similar level, which would show itself visually on the group output meter. If more than one channel is assigned to any group or stereo pair of groups, a rough balance may be set using the input gain controls on each channel (with faders at unity) and then adjusted in real time by the faders.

In order to optimise signal to noise on the tape machine, it is good practice to put similar levels on to all tracks. However, this is not how you, the engineer or musician, wish to hear them. A separate monitor mixer has been provided for this purpose above the group faders. This contains a 3-position input select switch for LINE (group output), OFF or TAPE (output from the multi-track tape machine) monitoring, a rotary fader (volume) and pan control for level position of the signal in the stereo mix, plus the four cue sends (as on every input channel) for echo and headphone mixes. In order to listen to any group(s), it is necessary only to select LINE monitoring and raise the VOLUME to a satisfactory level. The overall level of this mix is controlled by the REMIX fader, and is selected into the control monitors by the REM monitor select switch and monitor volume control.

Now we are in the position of having adequate level going to the tape machine and a mix of our groups on the monitor speakers. All that remains is to give the musician a headphone feed and we may start recording. In part (b) (iii) it was suggested that cue outputs 1 & 2 drive the headphone amplifiers, so turn cue masters 1 & 2 to level 7, switch the sends from each group monitor strip to PRE-fade, so that the musician's feed is not affected by anything we do with the rotary faders, and create a stereo headphone mix using the inner small knob (cue 1) as left, and the outer (cue 2) as right. It is possible to create a headphone mix from the individual channels, but we shall see later when over-dubbing, that the method just described means that the same mix is retained automatically when playing the tape back with the monitors switched to TAPE. We may listen to the headphone mix if required by selecting CUE on the monitor select switches and pressing buttons 1 & 2 on the cue master section.

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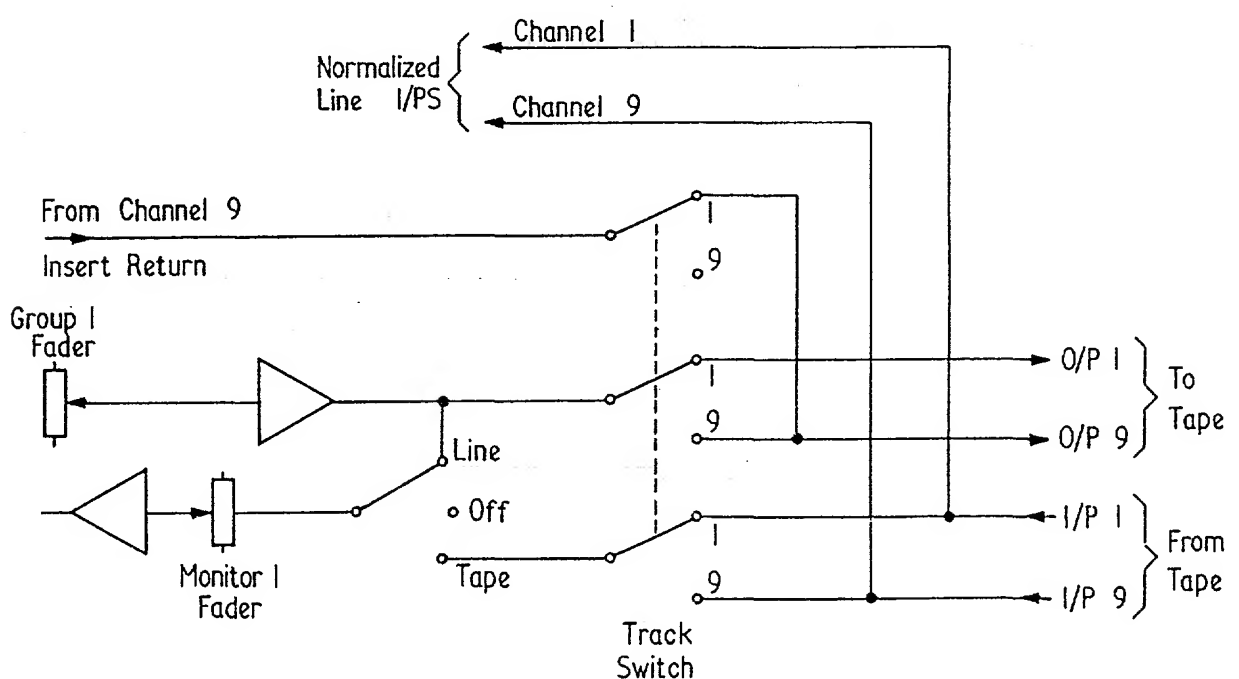
SECTION 1. (c) (Cont.)

(ii) Recording & monitoring simultaneously, more tracks than output groups available:

You will notice that a 4-group Soundcraft console has 8 sets of input/output sockets and an 8-group has 16 sets. There is also a track switch with each group, the function of which is as follows:-

To take the first switch, its two positions labelled "1" or "5" (4-group), "1" or "9" (8-group). In position "1", the group output goes to TRACK 1 and the monitor TAPE position is fed from TRACK 1. Simultaneously, CHANNEL 5 (or 9) insert return signal feeds TRACK 5 (or 9). This send is not metered inside the console (except by using the PFL meter) and must be observed on the tape machine itself. In this instance the level to tape is set by the channel input gain control, and is affected by anything inserted into the channel. The level into the monitor mix is controlled by the channel fader via the pan control and REM routing switch. With the track switch in the other position 5 (or 9), the group output feeds track 5 (or 9), and the monitor TAPE position is fed from TRACK 5 (or 9). Any tracks previously recorded may be monitored back through the input channel of identical number - e.g. TRACK 3 to CHANNEL 3, via the channel fader, pan control and REM routing switch. So it is possible to record 16 tracks simultaneously, given sensible planning of your session with regard to which instruments are in which channel. The diagram below showing the track switch function should explain further.

Track Switch example: Group 1 of an 8-group console:



SECTION 1.(c) (Cont.)

(iii) Over-dubbing:

Over-dubbing is the process of recording additional material in sync. with the original tracks. For this purpose the tape machine outputs are switched to the "sync" mode, and at the console the monitor input switches for tracks you have just recorded should be switched to TAPE. The control room and headphone mixes remain approximately as before. Complications arise if you are recording more tracks than you have groups. The simplest approach is to put down your new tracks using the channel insert returns. This allows you to retain your original monitor and headphone mixes and add to them from the relevant channels. Unfortunately, no console metering is available, and the level to tape is controlled by the channel input gain control, not the fader. Therefore, you may prefer to start afresh by creating a monitor mix of your original tracks, using the channels with line inputs normalised to those tracks, selected to Remix, and using your track switches to change the groups to the new tracks required. By using the tape machine in its input mode, it is possible to monitor the new tracks at the channel line inputs, if you have sufficient spare channels with which to record. This allows you to use all linear faders for the monitor mix, instead of a combination of rotary & linear.

(iv) Mix-down:

For final mix-down, select line input to the first 4, 8, or 16 channels, bringing the tape tracks into the appropriate channels - (providing that no other devices are plugged into these line inputs). A line input gain of between -5dB and 0dB is safe, unless extreme equalisation is to be used, in which case the input should be attenuated further. Route channels to REM (Remix).

The mixing process may be simplified by use of the outputs as stereo sub-groups - combinations of channels can then be routed to these, and the group then added to Remix by selecting line position on group monitors, the input level being set to position 7. (This gives unity gain through the desk if the group faders are at 0dB position, and allows any channel to be changed from sub-group to Remix without alteration of the balance).

The group monitors should not be selected to "tape", as the returns are still present at this point, and will cause confusion in the mix. If all tape returns are physically replugged into the channel line inputs, it is possible to use the Group output/input sockets as a send/return to an external processing device, which may then be switched by selecting tape (in) or line (out).

SECTION 1:

(d) The Series Two for Sound Reinforcement.

The Series Two, although originally designed and intended for studio use, has proved ideal for first-rate live sound reinforcement applications, providing more and better facilities than would normally be found on a mixer specifically designed for this purpose. The relatively small size and low weight of the mixer make it easily portable - to this end, we have designed a foam-lined aluminium flight case, available as an optional extra, to protect the mixer during transit from excessive vibration and shock. It should be noted that the warranty becomes invalidated if the mixer is used as a part of a touring sound system without the protection of a flight case.

(e) Interfacing the Series Two with a sound reinforcement system.

The Series Two as a recording console is not provided with a multipin connector for multicore connection as standard - however, this can be ordered to customer specification for any Series Two mixer. We recommend that for 12 and 16 channel mixers our Series One multicore system be used as it can be easily fitted to the Series Two, and as a standard Soundcraft item will be more cost-effective than a customised multicore system.

This multicore provides for 16 balanced mic lines within a braided conductive plastic screen, and 6 unbalanced or 3 balanced return lines within a separate braided conductive plastic screen. The outer casing is of tough P.V.C., coloured blue. The overall diameter of the cable is just over $\frac{1}{2}$ " (13.8mm.) and the construction is such as to make the cable twist- and kink-resistant whilst maintaining high flexibility. The connectors provided with this system are 56-pin Varelco screw-locking type. The stage-box is of die-cast construction with 16 female 3-pin Cannon connectors for microphones and 3 male 3-pin Cannon connectors for left, right and foldback returns. These can be balanced at the mixer if required.

For 24 channel mixers a very effective multicore system can be made up, using 2 Series One systems, the only slight disadvantage being the necessity to run two multicores. The advantages are in having 2 stage-boxes with overlapping channels from 9-16 that can be placed on either side of the stage, allowing L.H. and R.H. returns to be routed to their respective boxes, making a cross-stage link unnecessary, and allowing shorter runs of mic cable.

/ Cont.

(e) (Cont.)

Also, having 12 return lines allows for an electronic 3-way crossover to be situated at the mixer in either balanced or unbalanced systems. All 4 cue sends can also be returned to the stage, enabling a very comprehensive monitor mix to be accomplished from the main mixer.

It is appreciated that some customers prefer to design their own multi-core systems for specialised applications. With this in mind, we have available a modular stage-box system that can be built to almost any size, and allows the customer a choice of multicore and connectors.

(f) Operation of Series Two in sound reinforcement applications:

When using the console for mixing down to stereo, as in most sound reinforcement systems, the suggested procedure, to make the most effective use of the facilities available, is to use Remix as the left & right stereo masters. This allows the 4- or 8-group outputs to be used as 2 or 4 stereo sub-groups of channels - for example, vocals, drums, etc., without affecting the relative mix between the grouped channels. The signal path through the mixer, when being used in this manner, is as follows:-

- 1) Microphone or directly-injected signal to channel, which will be set up in a similar manner to that described in "Studio Operation", page 10.
- 2) Channel routed to either Remix, or a pair of groups - that is, Rem, 1 & 2, 3 & 4, 5 & 6, or 7 & 8. When routed to Remix, the post-fade channel output will appear directly on the master Left and Right outputs with the overall level control being the remix master fader. This is a stereo ganged fader, the stereo positioning being set at the channel pan pot. When routed to a pair of groups, the channel post-fade output will appear on the desired output groups, the relative level on each depending upon the channel pan position. This signal is then mixed on to Remix, using the output monitoring facilities, the correct stereo positioning being maintained by setting the Group monitor pan pots to 1 fully left, 2 fully right, 3 fully left, etc.

It is desirable to set the Group monitors for unity gain, so that a channel may be switched between a group and remix without level change. The monitor level controls are therefore set up and remain untouched during mixing. Unity gain position for these controls is between $6\frac{1}{2}$ and 7 on the calibrations. Level control of the sub-group is by the 2 group master faders, to which the channel or group of channels is routed. Obviously, these have to be moved together to retain the correct stereo positioning.

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The Remix and sub-group master faders should be kept at, or as near as possible to, the normal mixing position - that is 10dB down or '10' on the calibrations, as this ensures optimum noise and headroom conditions. Any departure from the normal mixing position on the sub-group faders will create a gain difference, causing level change if the channel is rerouted to remix or to another group. This should be taken into account before re-routing a channel.

One or more of the cues may be used as monitor returns to the stage, 4 completely independent mixes being available. In most cases, only one or two cue sends are required for on-stage monitoring, the others being used for effects.

The meters of the Series Two mixers are aligned for +4dBm at the 0VU mark on VU meters and at PPM 5 on peak programme meters. Most large power amplifiers, for example, Crown DC300A, accept +6dBm R.M.S. before clipping. The VU meter gives an average level read-out and will not indicate short duration peaks. Any outputs driving an amplifier with an input sensitivity similar to the Crown should have their levels kept nominally below 0VU, with only short excursions into the red being allowed.

When using PPM meters, as live programme material is very transient in nature and contains peaks of much higher level than the R.M.S. or average levels, it is probable that for the amplifiers to be fully driven, most of the time the meters will be reaching between PPM 6 & 7, (+8dBm - +12dBm), unless limiting/compression takes place after the remix outputs.

The channel L.E.D.'s are very fast peak reading indicators that show up any prefade channel levels of more than +15dBm. For live mixing these should only be allowed to flash very occasionally. It may be found that on particular types of signal (e.g. vocals or snare drum), the channel P.F.L. level may appear to be way below 0VU level, but the peak indicator still flashes. In this case always be guided by the L.E.D. indicators, and use the 20dB mic pad if necessary (see page 33).

Use of graphic equalisers, although expensive, makes the job of mixing much easier, especially when correctly set up with the assistance of a spectrum analyser. When using graphics, the channel equalisers can be used to maximum advantage in providing tonal balance between the various sources being mixed, without having a large part of their capability taken up in correcting inadequate speaker systems or acoustics.

SECTION 2 (a):

SOUNDCRAFT SERIES TWO OWNER INFORMATION

SERIAL NUMBER:

NUMBER OF CHANNELS:

NUMBER OF GROUPS:

TYPE OF FADERS:

POWER SUPPLY SERIAL NUMBER:

POWER SUPPLY RATING:

TYPE OF METERS:

POWER SUPPLY TAPS:

ADDITIONS:

.....
.....
.....

TESTED BY:

DATE:

SECTION 2. (b)

SOUNDCRAFT SERIES TWO: INDIVIDUAL SPECIFICATION.

SERIAL NUMBER. P.S.U. SERIAL NO.

DISTORTION:

- 1) Channel to Remix L via groups at 100Hz % THD.
at 1KHz % THD.
at 10KHz % THD.
- 2) Channel to Remix R via groups at 100Hz % THD.
at 1KHz % THD.
at 10KHz % THD.
- 3) Channel to Monitors via Cues at 100Hz % THD.
at 1KHz % THD.
at 10KHz % THD.
- 4) Channel line input to channel line output:

Channel:

THD % @ 1KHz:

1.	0.0
2.	0.0
3.	0.0
4.	0.0
5.	0.0
6.	0.0
7.	0.0
8.	0.0
9.	0.0
10.	0.0
11.	0.0
12.	0.0
13.	0.0
14.	0.0
15.	0.0
16.	0.0
17.	0.0
18.	0.0
19.	0.0
20.	0.0
21.	0.0
22.	0.0
23.	0.0
24.	0.0

SECTION 2. (b) (Cont.)

NOISE:

- 1) Relative Input Noise dBv.
- 2) Mixing Noise dBv.

FREQUENCY RESPONSE:

Channel to Remix via Groups 20Hz - 20KHz \pm dB.

Gain Structure:

Meter Alignment:

Equalisation:

Mechanics:

Appearance:

(Signed):

Date:

SECTION 2 (c): DESCRIPTION OF TESTS.

The individual specification consists of a series of measurements and checks made during the final test and inspection, to ensure that every mixer will conform to or surpass the claimed specification regarding all main mixer functions.

A complete specification covering all aspects of every mixer would be very time-consuming, and therefore prohibitively expensive. For this reason, only a few actual measurements are taken. These are made in such a way as to incorporate as many functions as possible in each test.

The following outlines the conditions under which each measurement is taken, and gives a brief explanation of the extent of each test and inspection.

Distortion Tests 1 & 2: (Channel to Remix via Groups).

This measurement is made using a channel selected at random, fed with a line input of +4dBm. The channel gain is set to unity, the equalisation switched in and set flat, the pan pot is central, and the channel routed to all output groups. The channel group and Remix faders are at unity gain position, and the group monitor levels are set at approx. 5, with the pans central to give +4dBm at the Remix outputs.

This measurement therefore includes any distortion incurred by:-

- 1) The Channel;
- 2) Any of the group summing, line, or monitor amps.
- 3) The Remix summing and line amps.

Obviously, any individual abnormal group distortion will be attenuated, but the test will detect this, since normal distortion is of such a very low order.

SECTION 2 (c) (Cont.)

Distortion Test 3: (Channel to Monitors via Cues)

Here, another channel selected at random is used, again with a line input of +4dBm, all cue sends switched to post-fade and turned up fully, the EQ switched in and set flat. The channel fader is at unity gain position. The Mono switch is selected, and the monitor level turned up to give +4dBm. At the monitor outputs, with all 4 cues selected to monitors and cue masters at position 8, the distortion reading is an average of Left & Right monitor outputs. This measurement therefore includes any distortion incurred by:-

- 1) the Channel;
- 2) any of the 4 Cue Masters;
- 3) the Monitor line amplifiers.

Distortion Test 4: (Channel line in to channel line out)

Each channel is measured for distortion with +4dBm @ 1KHz to the channel line input. The input gain and fader level set for unity, the reading being taken at the channel line output. The EQ is set to mechanical flat and is switched in. As noise is included in all distortion measurements, any excessive noise will show up during this test.

Noise Test 1: (Relative Input Noise)

Relative input noise is measured on one channel by setting up the channel to have a mic gain of 70dB, then loading the mic input with 200 Ω , the EQ switched in and set flat. The residual noise is measured at the channel line output, using DIN audio band weighting, and added to the gain to give the relative input noise figure. Although this measurement is only made on one channel, the residual noise levels of all channels when working at maximum gain are compared for similar spectral content and level.

Noise Test 2: (Mixing Noise)

Mixing noise is measured at the Remix outputs, and consists of all the channels (up to sixteen), routed to all the groups, whose monitor levels are set to give total output at remix equal to the level in each output group. The channel line inputs are selected with the input gain and all faders at Unity position. The noise reading is an average of Remix Left & Right outputs. This noise measurement will therefore include:-

/ Cont.

SECTION 2. (c) (Cont.)

- 1) The residual noise of all the channels at minimum gain;
- 2) The mixing noise produced by having all the channels routed to all the groups;
- 3) The residual noise of the group summing, line & monitor amps;
- 4) The residual noise of the Remix summing & line amplifiers.

Frequency Response:

This is measured using the same set-up as in Distortion Tests 1 & 2, but with the equalisation switched out. The quoted limits are referenced to 1KHz, and the measurement is made at unity gain with a line input of +4dBm.

Gain Structure:

The gain structure tests are made to check that all stages through which the signal must pass are operating with no excessive departure from the intended gain, rendering level calibrations correct.

Equalisation:

Equalisation is checked for correct frequency bands, amount of lift and cut, and noise-free operation, by listening to both digitally-generated pink noise and to a microphone signal.

Mechanics:

This is a general inspection, covering the operation of all moving parts of the mixer.

Appearance:

This inspection is made to ensure that when packed, the mixer is clean, undamaged, and in good condition.

SECTION 2.

(d) Full Specification:

Test Conditions:

All input and output levels are at +4dBm unless otherwise stated.
Noise measurements are all taken using Din audio band weighting.
All measurements are made with equalisation switched in and set to mechanical flat position, except frequency response, where measurements are made with equalisation switched out and are referenced to 1KHz. (See pages 32-33 for equaliser response characteristics).

1. Distortion: (all results include noise)

- (i) Any line input to any line output via any one signal path.
20Hz - 20KHz worst case T.H.D. less than 0.07 %.
Typically T.H.D. less than 0.01 %.
- (ii) Mic input at -50dBm (source Z 200 Ω) to channel line output at +4dBm.
20Hz - 20KHz T.H.D. less than 0.1 %.
- (iii) Oscillator output between 100Hz and 10KHz.
T.H.D. less than 0.07 %.

2. Frequency Response:

- (i) Any line input to any line output via any one signal path.
20Hz - 20KHz +0 - 2dB.
- (ii) Mic input at -50dBm to channel line output.
20Hz - 20KHz +0 - 3dB.
- (iii) Oscillator output 100Hz - 10KHz \pm 0.25dB.

3. Noise:

- (i) Relative input noise:
Source impedance 200 Ω . Channel gain 70dB.
Relative input noise better than -127.5dBv.
- (ii) Residual output noise:
Any output with the fader down, less than -95dBv.

/ Cont.

SECTION 2 (Cont.)

(iii) Mixing noise:

16 channels routed to Remix. All faders and input gains at unity.
Line input selected. Pan pots central. Output monitor levels down.
Mixing noise at Remix outputs less than -80dBv.

(iv) Power supply noise + ripple.

Main supply: Less than -60dBv at full load.

Phantom supply: Less than -60dBv, no load.

4. Crosstalk:

- (i) Two adjacent channels, both set up with a mic input of -50dBm at 1KHz, to give an output of +4dBm at channel line out.
The signal is removed from one channel, which is then terminated with 200Ω.

Relative crosstalk between channels, better than 60dB.

- (ii) Two adjacent channels at unity gain with line input selected - an input of +4dBm at 1KHz to one channel.

Relative crosstalk between channels, better than 90dB.

- (iii) Unrouted channel to remix. Line input to channel +4dBm at 1KHz. Channel set to unity gain. Channel and remix faders at unity gain position. All other faders down. Channel pan fully left.

Relative crosstalk between channel and remix left, better than 60dB.

- (iv) Remix stereo crosstalk: Conditions as in (iii) but with channel routed to remix.

Relative crosstalk between remix left & right, better than 60dB.

- (v) Group stereo crosstalk: Channel panned fully left and routed to Groups 1 & 2. Line input to channel +4dBm at 1KHz, channel at unity gain. Channel and Group 1 & 2 faders at unity gain position. All other faders down.

Relative crosstalk between Groups 1 & 2, better than 60dB.

SECTION 2. (Cont.)

5. Maximum input levels and impedances.

<u>INPUT:</u>	<u>MAXIMUM LEVEL:</u>	<u>IMPEDANCE:</u>
Channel line.	+35dBm.	27KΩ.
Channel mic.	-5dBm at 20Hz.	800Ω.
Channel mic with pad.	+15dBm at 20Hz.	2KΩ.
Insert return.	Any level depending on fader.	Not less than 5KΩ.
Echo return.	Any level depending on input attenuator.	50KΩ.
Replay.	Any level depending on monitor master setting.	Not less than 8KΩ.
Tape return.	Any level depending on group monitor level setting.	Not less than 9KΩ.

Maximum output levels and impedances.

<u>OUTPUT:</u>	<u>MAXIMUM LEVEL:</u>		<u>IMPEDANCE:</u>
	<u>No Load:</u>	<u>600Ω:</u>	
Channel line.	+18dBm.	-	All less than 40Ω.
Insert send.	+18dBm.	-	
Remix.	+24dBm.	+22dBm.	
Monitor.	+24dBm.	+22dBm.	
Cue.	+18dBm.	-	
Group.	+24dBm.	+22dBm.	
Oscillator.	+20dBm.	-	

SECTION 2: (Cont.)

6. Metering:

- (i) VUs to Bell specification.
- (ii) PPMs to BBC specification.

7. Mains supply voltages.

Standard voltages are:-

240, 220, 200, 110, as selected by voltage taps.

The mains transformer is provided with a lead out for 100v. operation.

This is left unconnected unless specified.

SECTION 2:

(e) Pre-delivery test procedure.

The procedure outlined below should be carried out on every mixer upon arrival, either by the dealer or purchaser, if bought directly from Soundcraft. The minimum of equipment is required, all the tests being simple go, no-go types. Any damage caused in transit should show up and can then be acted upon immediately. It may also prove useful for periodic studio maintenance.

Equipment required:

1 pair of stereo headphones of impedance greater than 200Ω.

1 x 2-meter mono jack-to-jack lead.

1 microphone - preferably condenser type.

(1) Preliminary checks and procedures.

- (i) After unpacking, the mixer should undergo a thorough visual inspection. Any signs of damage should be reported immediately to the dealer, or to Soundcraft.
- (ii) Connect a suitable (earthed) mains plug to the cannon mains lead. Colour code: Brown - live. Blue - neutral. Green/Yellow - earth.
- (iii) Set power supply tap to correct voltage by removing the fuse and turning the voltage tap with a small coin until the red line indicates the required voltage. The taps connected are 240v, 220v, 200v and 110v. A 6% variation on these voltages can be accommodated.
- (iv) Turn all channels and echo returns to "off" and input gain and fader levels down.
- (v) Turn group monitor levels down and bring down group faders.
- (vi) Plug the 4-pin Cannon lead into the P.S.U. socket on the rear panel and plug in the mains. (There is no mains on/off switch on the mixer). Meter illumination will indicate that power is being supplied to the mixer.

(2) Checking output groups as fed from the slate buss:

Set up monitor section as follows:-

- (i) Remix fader to unity gain position.
- (ii) Remix selected to monitors (REM).
- (iii) Monitor master level at approx. 7.
- (iv) Oscillator to slate, level at 5, frequency at 1 KHz.
- (v) Mono, Dim and T/B buttons out.

Set up group monitor section as follows:-

- (i) Cues all off, and down.
- (ii) Line selected.

SECTION 2 (cont.) (e)

(iii) Pans central.

(iv) All meters switched to read groups.

Bring up Group 1 fader till meter 1 reads 0 VU, or PPM 5 (+4dBm). Insert headphones into headphone monitor socket. Bring up Group Monitor 1 level until a central image of adequate level is heard (approx. position 7 on monitor level). This should be without a trace of distortion. Pan Group Monitor 1 from side to side - the image should follow the pan position. Repeat for all output groups.

With all group faders up, meters reading 0 VU (PPM 5), and track switches to 1-4 (or 1-8) for 4 or 8-track mixers respectively, plug the headphones into Group Output 1 socket. The signal should be heard on one side of the headphones. Switch track switch 1 to 5 (or 9) and check that the signal disappears from Group Output 1 and appears at 5 (or 9). Repeat for all output groups.

(3) Checking multi-track tape returns, cue masters & output cue sends:

(i) Set up monitor section as in (2), but with oscillator to "ON", not slate, and cue selected.

(ii) Turn cue masters fully up and select 1, 2, 3 & 4 to monitors.

(iii) Switch all output group monitors to "tape" and track switches to the first 4 (or 8). Plug headphones into headphone monitor socket. With a jack-to-jack lead, plug from oscillator output to tape input 1. Meter 1 will read oscillator signal - adjust oscillator level until 0 VU (or PPM 5) is reached. Switch cue 1 & 2 to prefade and bring up cue 1. This signal will appear on the left side of the monitors. Now bring up cue 2, which will appear on the right side of cues, providing a central image. Now switch to post-fade and bring up group monitor level 1. A central image will again be heard. Turn down cue 1, check that left-hand side disappears. Turn down cue 2 and switch cues off. Repeat for cues 3 & 4. Change track switch 1 to 5 (or 9), check meter 1 signal disappears, and plug oscillator into tape return 5 (or 9). Meter 1 will again read the oscillator signal. Plug oscillator into tape return 2 and repeat above procedure for all output groups.

(4) Checking the monitor section:

Remix left and right and cue monitoring has already been checked by the above procedure.

(i) Set up the monitor section as in (2) but the REP (Replay) selected and oscillator switched to "ON".

(ii) Switch meters 1 & 2 to read monitor select and meter 4 to PFL.

SECTION 2 (Cont.)

Plug the jack-to-jack lead from oscillator output to Replay left. Meter 1 will read and oscillator will be heard in headphones left. Repeat for Replay right. Monitor outputs should also be checked while replay is being tested. Simply plug the headphones into monitor left and right while testing replay left and right respectively. Sound will only be heard on one side of the headphones.

Check the mono facility. (It should be noted that the meters will not read in mono, nor are they affected by DIM. The switch only affects the headphone and monitor outputs). Check the DIM facility (provides 20dB attenuation of monitor and headphone outputs).

Turn oscillator off and plug a low impedance dynamic microphone into the T/B socket. Select Cue 1 & 2 to monitors with cue masters turned up fully. Select T/B and turn up T/B level until meters 1 & 2 read a good level for speech. This will sound very low, as the 20dB pad automatically mutes the monitors when T/B is selected.

PFL will be checked during input and echo channel tests.

(5) Checking the Echo Channels:

- (i) Set up monitor section as in (2) but with oscillator switched to "ON" and PFL selected. Meter 4 should be switched to read PFL.
- (ii) Echo 1 & 2 faders to unity gain position.
- (iii) Echo cue sends off and down.
- (iv) Echo 1 & 2 unrouted, switched to PFL.

With a jack-to-jack lead plug from oscillator output to echo return 1. Bring up echo 1 input level until PFL meter reads 0 VU. Check sound is without distortion. Select cues 1, 2, 3 & 4 to monitors, and turn up masters to full. Repeat procedure outlined in (3) for testing output cue sends. (Note that all echo return cues are prefade only). Select monitors to remix, and route echo 1 to remix. Check panning. Repeat for echo 2. Check routing to groups by switching all meters to read Groups (Group monitors selected to line), and bringing all group faders to unity gain position.

With Echo 2 routed to all groups and the pan pot central, all output meters will read oscillator signal. Pan echo 2 from left to right and check that meters all follow panning.

/ Cont.

SECTION 2: (cont.)

(6) Checking the input channels:

- (i) Set up monitors as in (5) (i).
- (ii) Select line input to all channels.
- (iii) Switch all channels to PFL.
- (iv) Set channel gains to unity for line input.
- (v) All channel faders down.
- (vi) All channel cue sends off and down.
- (vii) All channel EQ's switched out.

Plug from oscillator output to each channel's line input in turn. Each should read on the PFL meters and should be checked for distortion-free output. Turn oscillator output level up to approximately 7, and run through each line input again to check that the LED is working. Turn oscillator back to the original level and bring channel faders up to unity gain position. Route all channels to Rem (Remix), select remix to monitors and switch meters 1 & 2 to read monitor select. Run through each channel's line input, checking panning to remix. Also check the channel's insert send and line outputs by plugging the headphones directly into these sockets.

On 4 (8) group mixers, the 8 (16) tape returns are normalised through to the first 8 (16) channels line inputs on break jacks. This normalisation should be checked by plugging the oscillator output into the multi-track tape returns and treating them as these channels' line inputs. At the same time, on 4 (8) track mixers, the insert sends of channels 5 - 8 (or 9 - 16) appear at group output sockets 5 - 8 (or 9 - 16), only if the track switches are in positions 1-4 (or 1-8). This can be checked again by plugging the headphones directly into these sockets. Make sure the signal disappears when the track switches are changed to positions 5 - 8 (or 9 - 16).

Check the channel cue sends, using the same procedure as in (3).

Select mic input to all channels. Switch in equalisation and route channels to all output groups. With monitors selected to remix, group and remix faders to unity gain position, and group monitors selected to line with the level at approximately 5 and panned 1 left, 2 right, 3 left, etc., plug a condenser mic into channel 1 and switch on phantom supply (switch towards 'phantom'). Channel mic gain at 20-30 dB should be about right for this type of mic at normal talking level. Listen to the channel with headphones via the monitors. Check channel panning to groups.

Run through all the equalisation controls. Set the EQ for mechanical flat position and switch out EQ. Check there is no difference in sound or level. Depress the pad and check the level drops. The attenuation of the pad is 20dB.

/ Cont.

SECTION 2 (cont)

As a final check, select all channels to line input, turn up channel gains to maximum and all faders down. Turn monitor master level to maximum and select to PFL. Switch each channel in turn to PFL and listen to the noise. This should be smooth and spike-free, with no trace of hum. Switch in EQ (set to mechanical flat) and ensure there is no great change in the nature of the noise or level of noise. Repeat for all channels, comparing levels.

--oo0oo--

SECTION 3: (a) GENERAL DESCRIPTION. - Introduction.

The following description is to make clear the function of each particular circuit block, to give the user a simplified idea of what is happening inside the mixer, and the reasoning behind the various approaches in design - so that better use can be made of the mixer, and any faults can be isolated more easily. It is not proposed to describe the wiring and signal paths, as reference to the Block Diagram of the complete mixer will provide this information in a more understandable form. (Page 54).

(b) THE INPUT CHANNEL:

This can most easily be dealt with in 3 separate sections - firstly, the mic amp; secondly, the equalisation, and lastly, the output section.

1) The Mic Amp:

The mic amp serves to match the level of the input signal to the EQ and output sections, in order that they can be driven with the correct signal level for optimum performance. It must also present a constant input impedance to the source for correct matching and introduce as little noise as possible. As the mic amp has to accept such a wide range of input levels whilst maintaining extremely high quality, it was decided that the best approach would be to use a variable gain amplifier instead of a fixed high gain amp fed from an attenuator, as used in many other mixers. This avoids problems of input impedance change with volume setting and allows optimum noise & headroom conditions to be maintained over the entire operating range. The gain of the amplifier is variable over a 60dB range; the mic transformer has a turns ratio of 5:1, giving approx. 70dB gain before the EQ stage. There is also 10dB gain available after both the channel fader and the output fader, giving a maximum possible gain through the mixer of 90dB with the pan pot central.

Both mic and line inputs can be permanently connected to the mixer, as provision has been made for selection between the two. A 20dB pad prior to the mic transformer is also incorporated to prevent transformer saturation when using high output condenser microphones. This should generally be used, as it provides an input impedance more suitable to this type of microphone, unless it is found that very high gain settings are necessary, in which case it will be better in terms of signal/noise ratio to remove the pad and use lower gain settings.

SECTION 3: (b) (Cont.)

2) Channel Equalisation.

There are two types of equalisation available for the Series Two range of mixers - the standard type being a 4-band fixed frequency EQ which offers $\pm 15\text{dB}$ at 50Hz, 300Hz, 3.5KHz and 15KHz, and a sweepable high pass filter (bass chop), giving fixed 12dB/octave attenuation, the -3dB point being at any frequency between 20Hz and 400Hz. This EQ provides a wide range of tonal variation and, coupled with the ability of the high pass filter to clean up the bottom end of the frequency spectrum, will provide the user with adequate EQ for most situations.

Very little interaction occurs between the 4 frequency bands, as the low frequency and upper-mid frequency bands are in a feedback loop around one amplifier, and the lower mid and high frequency bands are in a feedback loop around a separate amplifier - therefore neither amplifier has to accommodate large amounts of lift & cut at adjacent frequencies.

The second type of EQ available provides much greater scope for variation. This has been achieved by making the 2 mid-frequencies variable not only in lift & cut but also in frequency. The control on the standard EQ, which provided $\pm 15\text{dB}$ at 300Hz, here provides $\pm 15\text{dB}$ at any frequency selectable between 250Hz and 4KHz, and the upper mid control, previously 3.5KHz, provides $\pm 15\text{dB}$ at any frequency selectable between 600Hz and 10KHz.

It can be seen then that the two controls overlap between 600Hz and 4KHz, allowing very large lift and cut over the most important part of the spectrum, and a wide variety of effects by lifting one and cutting the other, etc. Also incorporated in the EQ is a low pass filter (top chop), with a fixed attenuation of 12dB/octave, the 3dB point being at any frequency selectable between 25KHz & 1.5 KHz.

The characteristics of the two types of EQ may be more readily understood from the following graphs.

SECTION 3: (b) (Cont.)

3) The Channel Output Section.

This part of the channel incorporates the line output amplifier, the pan pot, the fader, the routing, the cue sends, and the peak level indicator. The line output amplifier function is to drive the pan pot, the routing, and any cue sends selected to post fade; there is also an output from each channel taken from this amplifier (line output), so that the channels may be used to directly feed a multi-track tape recorder.

This amplifier has a gain of 10dB, in order that the loss due to the fader at the normal mixing position (i.e. 10dB down) is made up in the channel instead of in the summing amplifier, thereby avoiding increased noise.

The peak level L.E.D. indicates any prefade signal level that is above +15dBm, the maximum level that can be accommodated by the channel is +20dBm, therefore it does not show that the channel is distorting, but gives warning that limits of channel headroom are being approached.

N.B. On channels fitted with Sweep EQ, the L.E.D. peak indicator shows the pre-insert level, whereas at the moment, channels fitted with the standard EQ show the post-insert level. It is intended to modify the standard EQ channel in future, so that the indicator will show the pre-insert level, as it has been decided that it is more desirable to indicate peak levels prior to external signal treatment.

SECTION 3:

(c) The Echo Return Channels:

Two echo return channels are provided on the mixer. These are similar to the input channels but without the facilities of equalisation or balanced mic level inputs. Echo return channel 1, however, can only be routed to the remix busses, whereas echo return 2 has the same routing capability as an input channel.

The pre amp used in the echo channels has a gain of 30dB, the input level control is in the form of a rotary potentiometer. The advantages of a variable gain pre amp are not necessary here, as only line inputs are to be used, and the gain at this stage is much less than the maximum gain of the channel mic amps. A wide range of input levels can be accommodated, the input impedance being approximately 50K Ω . The usual method of using these channels for echo or other effects is to take a send from one of the cues to the effects unit and then return into either of the two echo channels, depending on whether full routing or routing to remix only is required. The cue sends on the echo channels can now be used to control the amount of repeat echo, as this will return the echo signal to the cue output being used, forming a separately-controllable feedback path, or to mix the echo signal on to other cue busses.

(d) The Group Outputs:

Each group output circuit board contains 3 amplifiers. A virtual earth summing amplifier, a line output amplifier, and a monitor amplifier. The summing amplifier sums all the signals from the channels routed to that particular group. The output of this drives the line output amplifier via the group master fader. The line output amplifier has a gain of 10dB in order to make up for the loss incurred by the fader at the normal mixing position. This amplifier output is taken to the tape output via the track switches, whose function is to allow 16-track recording with an 8-output mixer, or an 8-track recording with a 4-output mixer, without any need for replugging.

/ Cont.

SECTION 3:

(d) The Group Outputs (cont).

The tape recorder outputs come back into the mixer via the tape return jacks and are fed simultaneously to the channel line input jacks on the normalised side, to facilitate mix-down through the channels - and back to the group output circuit board, again via the track switches, so that monitoring of the outputs and tape returns is possible whilst the recording is taking place, and so that the same monitor mix may be used for mix-down.

The output monitoring facilities consist of a switch to select the input of the monitor amplifier between send-to-tape and return-from tape - (this also selects the meters to read the tape send or return) - a monitor level control, cue sends, (the pre/post switch refers to the monitor level control, not the group output fader), and a pan pot for stereo positioning of the signal being monitored on to the remix left and right busses.

(e) The Cue Masters:

The cue masters board is the least complicated circuit board in the mixer. It consists of 4 variable gain summing line amps, and switching for monitor selection. Each amplifier sums all the signals from its respective cue buss, then feeds directly to the 4 cue outputs, and back on to the remix and PFL busses via the selection switches, to allow for monitoring and metering. The master level control takes the form of a variable feedback loop, thereby avoiding separate summing and line amps. Because of this, the control will not cut off completely, but gives a range of approximately 45dB with unity gain at maximum.

More recent consoles have been modified to give 6dB gain at maximum. This is accomplished by altering the potentiometer from 47KB to 100KB.

SECTION 3.

(f) The Monitoring System:

The monitoring facilities provided on the Series Two range are extremely comprehensive, allowing a clear picture of all the mixer functions to be obtained easily and quickly. Selection between the functions to be monitored takes place on a row of 4 interlocking push buttons immediately below the rotary monitor master level control (see diagram page 9). The first of these push buttons selects Remix, allowing any channels to be monitored post-fade in stereo, as well as any mix of the output groups or tape returns. The second button selects the 2-track tape returns (Replay) on to monitors. Comparison of the 2-track tape send & return is possible during recording, by simply switching between remix and replay. The third button allows monitoring of the 4 cue master sends, either individually, or in any combination, as chosen by the 4 push buttons in-between the cue master level pots. These appear on the monitors as Cue 1 Left, Cue 2 Right, Cue 3 Left, Cue 4 Right, allowing a pair of cues to be used and monitored in stereo. (The mono facility can be used to bring any cue to stereo centre). Metering of the function being monitored takes place on group output meters 1 & 2, when switched to "Mon Select". The fourth button selects PFL to monitors. This allows monitoring of individual channel prefade levels or combinations of channels. The 4 cue sends also appear on PFL as selected on the push buttons mentioned above. Metering is by switching group output meter 4 to PFL. This allows metering of PFL or cues while monitoring of other functions is taking place. The monitor circuit board, as well as containing the 2 monitor line amplifiers, remix, summing & line amplifiers, and PFL summing amplifier, also contains the oscillator and talkback amplifier. These both feed a "slate" buss that puts the talkback amplifier or oscillator (not both together, as each output will feed into the other, causing distortion) on to all the outputs and cue sends. When T/B is selected, a 20dB pad automatically mutes the studio monitors to prevent feedback. Manual selection of this pad is also provided by a switch in-between the T/B and mono buttons. The oscillator has a level control and a variable frequency sweep from 100Hz - 10KHz. When the frequency is swept the output will take a couple of seconds to restabilise. The off/on/slate switch when in the "off" position shorts out the thermistor in the oscillator's feedback, ensuring that the signal is completely removed. The switch should always be left in this position when the oscillator is not in use, to prevent any tone breakthrough to other parts of the mixer. In the "on" position, the oscillator output appears only at the socket on the rear of the mixer, for general checks as described later. In the "slate" position, the oscillator output appears on all the outputs and cue sends, to facilitate lining-up of tape machines and effects units to the mixer.

SECTION 4.

SERVICING: (a) Introduction.

Every mixer that leaves Soundcraft undergoes thorough testing at all stages of manufacture. These tests include individual testing of every function on all the printed circuit boards before assembly, thorough testing of all functions of the completed mixer, a soak test of at least 48 hours before the final test, which consists of listening, measuring, and mechanical function checks prior to packaging and shipment. In this way we try to ensure that any defects caused by faulty components or manufacture show up long before the mixer leaves the company. Thus a long and trouble-free life can be expected.

However, should any fault occur, the mixer has been designed in such a way as to allow fast and easy servicing, which for the majority of faults can be accomplished in a few minutes by replacing the faulty circuit board. Virtually no knowledge of electronics is necessary to carry this out and, in the case of the main circuit boards (input, output, PSU, echo, cues master and monitor), no soldering is necessary either. Faulty boards can be returned to the nearest distributor or to Soundcraft for repair or replacement. Assistance in any technical difficulties encountered can also be obtained from the nearest distributor or from Soundcraft's technical department (a complete list of distributors given at the end of this manual). Because of the difficulty, cost & inconvenience of returning a complete mixer, this should be avoided unless absolutely necessary. Before returning a mixer, contact your nearest distributor for advice on the particular fault concerned, and on where and how the mixer should be sent if no alternative can be found.

It is appreciated that a large proportion of our customers have both the technical ability and equipment available to undertake all servicing themselves and will decide to take this option for convenience. For this reason, complete circuit diagrams, component descriptions and servicing data has been included as well as component ordering sheets. Full technical back-up will be given to assist in the identification of any particularly obscure faults, as well as advice on any modifications or additions the customer may wish to make to the mixer. Please refer to the Warranty notes at the back of this manual.

SECTION 4.

SERVICING: (b) Isolating faults.

Before attempts are made to open up the mixer, any suspected faults should be isolated to the particular circuit block in which they are occurring. Observation of the mixer, block and circuit board diagrams show that it is possible to inject signal into and trace the output from virtually all the individual circuit blocks within the mixer, simply by using the available connectors on the rear panel and the various functions on the monitoring section. For example, a channel that is said to distort ... firstly, it is a good idea to check that the channel is distorting by listening to a signal passing through all the circuit blocks contained within that channel and then to compare the result with another channel set up in exactly the same manner. A simple procedure for doing this is set out below:-

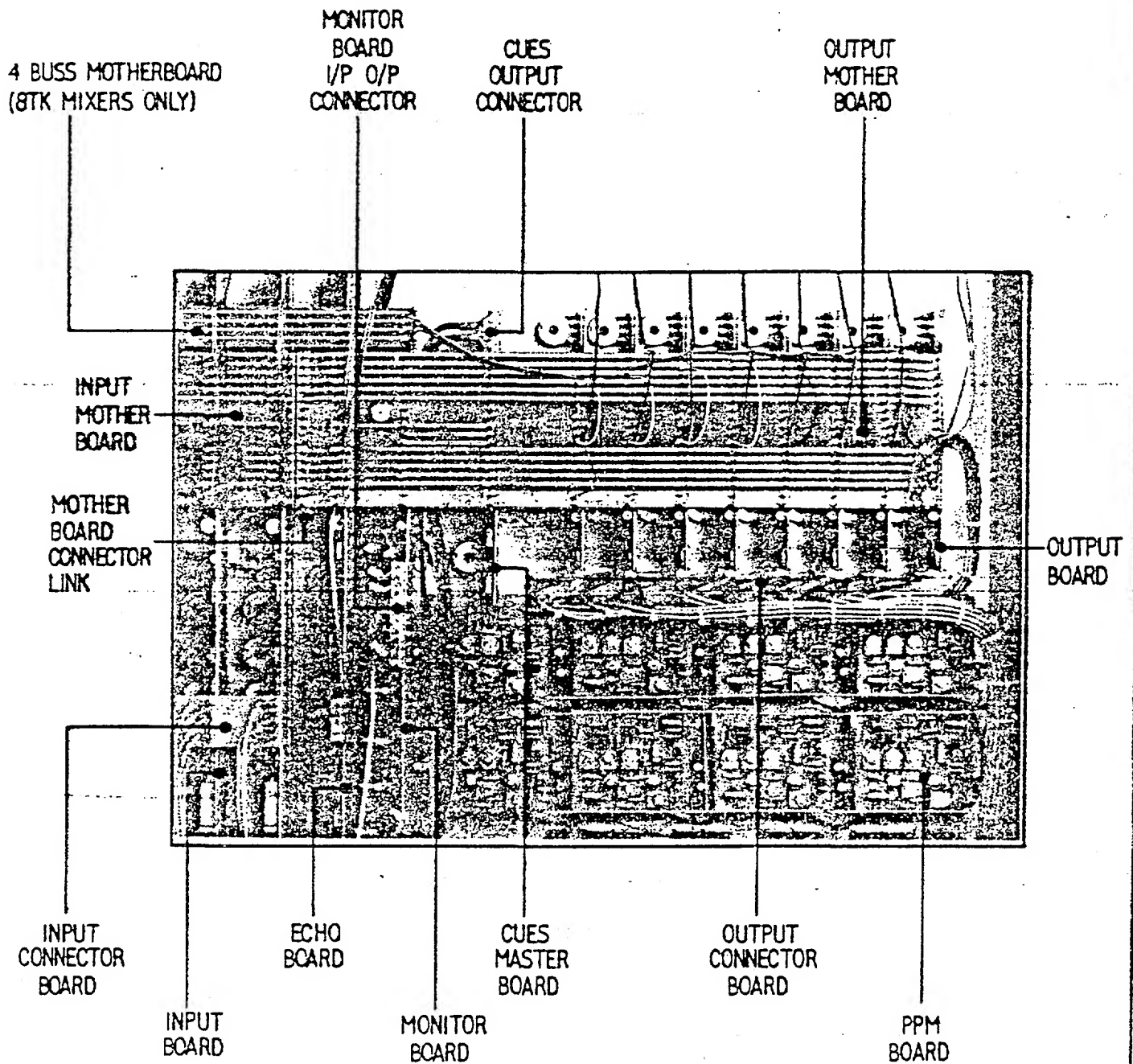
Set up channel controls as follows:-

Phantom Power	..... Off.
Pad	..... Out.
Line Input	..... Selected.
Mic Amp Gain	..... Set to Unity for line I/P.
Equalisation	..... Set flat & switched off.
Cues	..... Turned down & switched off.
Pan Pot	..... Central.
Channel Status	..... Switched to PFL.
Fader	..... Unity gain position.
Routing	..... Remix selected.

With a jack-to-jack lead plug the internal oscillator output into the faulty channel's line input. The oscillator should be set up to give an approximate output of +4dBm, which will occur when the oscillator level control is set half-way. The frequency should be set at 1000Hz, and the oscillator should be switched to "ON", not Slate. The channel can then be listened to via the monitor, by selecting remix to monitors and bringing up the remix master fader. Compare the result with another channel. If the fault is immediately obvious, find the section in which it is occurring by working through the various stages of the channel. For instance, by selecting PFL on to monitors, the channel line output amp is bypassed, therefore if the fault disappears it must be occurring at this stage.

/ Cont.

INTERCONNECTION OF OUTPUT, CUES, MONITOR, ECHO, METER AND INPUT CIRCUIT BOARDS.



SECTION 4. (Cont.)

The equaliser can be switched out; again if the fault disappears it must be at this stage - if not, then as you will now be listening to the mic amp output, the fault is here. As a check feed the oscillator into the channel insert return thereby cutting out the mic amp and listen to remix again; if all is well then it can be seen that the fault is occurring in the mic amp and is not, for instance, a fault common to the entire circuit board. (This could occur if, for example, the H.T. in the particular channel was being loaded down in some way, or if the fault is being caused by R.F. oscillation).

A fault that has been traced to the equalisation section can be further isolated by listening to each equaliser band whilst lifting & cutting (or, in the case of the sweep equalisation, also sweeping the frequency of lift or cut). It will be found that some controls affect the fault, while others have little or no effect. Here it is reasonable to assume the controls that have the greatest effect on the sound of the fault follow the fault, whereas the controls that have no effect precede the fault. Reference to the circuit diagram will show in which section the fault is occurring.

This procedure is intended to give a general idea of how to isolate a fault. A similar procedure can be used on all the other mixer functions. All the input jack sockets can readily accept +4 dBm and all the outputs can drive a pair of high impedance headphones (greater than 200 Ω) if an oscilloscope is not available.

(c) Removal of Printed Circuit Boards - General.

Access to the mixer is gained by removing the bottom plate. Before this can be done, however, a suitable method of supporting without obstructing the top or bottom of the mixer must be found. The easiest way is to stand the mixer on one of its end cheeks. Make sure that it is prevented from falling over, and do provide protection for the end cheek, as they scratch quite easily. With the mixer properly supported, remove the pozidrive screws holding the bottom plate and lift this off.

(d) Removal of Input Boards.

Input boards can be removed in sections of four, as follows:-

1. Unplug the motherboard connection links on either side of the motherboard section corresponding to the channels being removed.

/ Cont.

SECTION 4. (Cont.)

2. Disengage the motherboard section from the channels by firmly pulling it back as evenly as possible, to avoid bending the connector pins.
3. In the case of 8-track mixers, pull off the four buss motherboard. This cannot be completely removed unless it is disconnected from the output section, but for input section removal it is only necessary to pull it back until the connectors are just disengaged.
4. Pull off the input connection board corresponding to the section being removed.
5. Using the Allen screwdriver provided, unscrew the screws at the top and bottom of the panel on which the input boards are mounted. The section may now be carefully lifted out from the front of the mixer.

Most servicing can now proceed without having to remove the input board from its associated metal work. However, should this prove necessary either for fault-finding or for replacing an input board, this can quite easily be achieved as follows:-

1. Remove the caps from the collet knobs using a knife or fingernail.
2. Remove the collet knobs using the tool provided, by turning all knobs fully anticlockwise and loosening the collets half a turn or so - this unlocks the collets from the shafts, allowing the knobs to be pulled off.
3. Remove the pot nuts and washers, using a 14mm. box spanner.
4. Remove the nut holding the EQ in/out switch, using an 8mm box spanner.

The circuit board can now be completely removed from the metalwork. Follow the same procedure in reverse for re-assembly.

(e) Removal of Output Boards.

Output boards have to be removed individually. On no account should any attempt be made to remove the complete output section panel from the mixer frame. The procedure for removing an output board is as follows:-

1. Unplug the last motherboard connection link - i.e. the one that connects the last input section motherboard to the output section motherboard.

/ Cont.

SECTION 4. (Cont.)

2. Pull off the output section motherboard. This requires a fair amount of force as there are so many connections to be disengaged. It is easiest to start at one end and pull out each connector a small amount, working along to the other end, then work back again pulling each connector a bit further. Continue this until the complete motherboard is removed. This only has to be pulled back an inch or so to allow removal of any circuit board.

3. Pull off the 4-way output connector card.

4. Follow the procedure given for removing the knobs and pot nuts and washers from the input boards. The output board can now be lifted out from the back of the mixer.

(f) Removal of the Echo Board.

Follow the same procedure as for the output board removal.

(g) Removal of Cues Master Board.

Again, follow the same procedure as for the output board removal.

(h) Removal of Monitor Board.

This board has two solder connections to the copper track side, the talk-back mic input and the P.F.L. meter send, that have to be soldered before the board can be completely removed. This should be accomplished as follows:-

1. Remove the motherboard as in output board removal 1 & 2.
2. Follow the procedure given for removing the knobs, pot nuts & washers from the input boards.
3. Unplug the monitor input/output connector.
4. Unplug the 3-way meter send connector. This is situated on the component side of the board, immediately behind the motherboard.
5. Carefully pull the monitor board from the metal work, and down away from the faders. This will expose the two leads that have to be unsoldered. Mark the position of these two leads, using a felt-tip pen (not pencil, as graphite is conductive), and unsolder. The monitor board will now lift out of the mixer.

(i) Removal of the V.U. Meter Board.

This is secured directly to the back of the meters by bolting to the meter connection studs. The DC supply, earth and input connection leads, have

SECTION 4. (Cont.)

to be unsoldered and the meter nuts removed, using a 7mm. box spanner. The meter board can now be pulled off the studs.

(j) Removal of PPM Meter Board.

Follow the same procedure as given for the V.U. meter board.

(k) Removal of Input Transformer Board.

Follow the procedure for removing the input channel sections. With all the input channels removed, the transformer board will be clearly visible. This is secured by 4 BA pozidrive screws which will be seen between the line and pad switches. Removal of these will allow the board to be lifted back, providing access to all the connections on the underside of the board. Complete removal of this board is only possible if all the transformer and line input/output connections are unsoldered. However, this should never be necessary unless the actual board is physically damaged in some way.

(l) Servicing of Removed Printed Circuit Boards.

Essential Equipment:

1. Well-regulated power supply with an output of +40 volts and at least 200 m. A. current capability.
2. Low distortion oscillator with sine and square wave output and level capability of +20dBm. A switched 10dB step attenuator makes the gain measurements easier and faster.
3. Oscilloscope with a resolution of at least 10mV/centimetre. High frequency capability is unnecessary, 1 MHz being quite adequate.
4. An accurate high sensitivity multimeter.
5. An accurate A.C. voltage meter with high input impedance and calibrations in dBm. Ten-dB-stepped ranges are very useful.

Procedure:

All the input/output connections shown in the circuit diagrams are drawn in the same positions as they occur on the actual circuit board. Power supply, input, and output connections can be made to the circuit board either by inserting 16 or 18 s.w.g. solid copper wire into the molex connectors, or with crocodile or probe clips connecting directly on to the component lead-out wires.

/ Cont.

SECTION 4. (Cont.)

Circuit boards cannot be tested right through from input to final output unless links are used to replace inserts and faders. However, if each circuit block is tested in turn, it can be safely assumed that the complete circuit board is functioning correctly.

Sine wave testing will very rapidly give the engineer a good idea as to whether the circuit is functioning within specification regarding distortion, level capability, and gain, whilst square wave testing will quickly show correct frequency response and equaliser operation.

The D.C. levels for every transistor and i.c. are given to assist in the location of faults. These are average values measured and can be expected to vary approximately 5% or so. The measurements were made using a Keithley 172 D.M.M. that has an input impedance in excess of $10M\Omega$ - this must be taken into consideration when measuring certain parts of the circuits. ~~For instance, if a meter with an input sensitivity of only $20K\Omega/volt$ is used,~~ (e.g. Avo model 8, etc.), considerable deviation from these figures can be expected, particularly transistor base voltages.

It should be noted that in the mic amplifier the transistors are all D.C., coupled with D.C. feedback applied. A D.C. voltage measuring incorrectly will in most cases indicate incorrect D.C. voltages in other parts of the circuit. A fairly simple method of fault tracing within this circuit is to remove the four transistors and check them out of circuit. If all seems well then check the D.C. voltages at the transistor connection points with the transistors out of circuit. A table of these values is given on page 56. This should immediately narrow the fault down to a few components, or directly indicate the faulty part.

Assuming the D.C. conditions of a particular circuit seem satisfactory but a fault still appears - for example, a component becoming noisy, or capacitor open circuit causing incorrect frequency response or R.F. instability, etc. - normal fault-finding procedures should be followed. That is, to narrow down the area in which the fault is occurring by analysing the circuit diagram, then checking suspect components for likely symptoms. Capacitor and resistor substitution boxes are very useful here. Component freezer is also useful for isolating noisy components - however, care should be taken not to freeze i.c.'s, as it has been found that permanent breakdown can result from excessive cooling of these devices.

/ Cont.

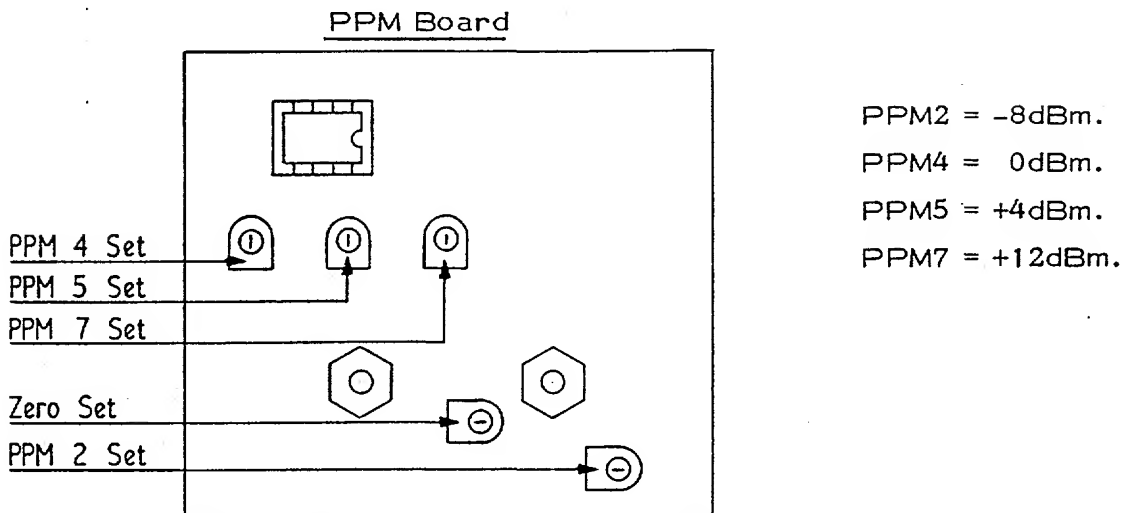
Points to note:

1. When testing virtual earth summing amplifiers, it is essential to use a summing resistor in series with the input. A value of $22K\Omega$ should be used everywhere except for the PFL and cue summing amplifiers, where $47K\Omega$ should be used. These values will ensure the correct gain of the amplifier under test.
2. When measuring or tracing sources of noise, always load the input with 200Ω load.
3. Test equipment, when used on intermediate stages, may sometimes cause R.F. oscillation, especially if the earthing of the test equipment is imperfect. A series resistor of a few hundred ohms, with the test lead causing the oscillation, will in most cases solve the problem.

SECTION 4. (Cont.)

(m) PPM LINING-UP PROCEDURE:

It is best to line up all the meters together using the mixer's internal oscillator. Follow the procedure given below:-



1. Set the mixer's internal oscillator to 1KHz and Slate.
2. Bring up the group faders to approximately unity gain position.
3. Using an accurate A.C. voltmeter plugged into Output 1, bring up the oscillator level until the voltmeter reads 0dBm. Now plug the voltmeter into each output in turn, setting the fader so that the outputs all read 0dBm.
4. Turn off the oscillator and set the presets to mid position.
5. Use the zero preset to align the meters to the L.H. scale mark.
6. Turn up the oscillator until the voltmeter reads -8dBm - (it is only necessary to meter one of the outputs for the rest of the procedure, as all the outputs will adjust in proportion, unless one of the faders is moved) - and adjust the meters for PPM2. Continue with PPM4, PPM5, and PPM7.
7. Turn off the oscillator and check the zero position, re-align if necessary, then run through (6) again.

In the event of any lining-up inconsistencies, correct lining-up at PPM4 and PPM5 should at least be achieved.

A new type of PPM board will be found on later mixers (see pages 71,72), the lining-up procedure being identical except for setting up zero, as this is set in the factory. An additional preset has been added for PPM6 - corresponding to +8dBm.

SECTION 4: (Cont.)

(h) Sweep EQ Alignment:

The two middle frequency sweepable lift and cut sections of the equaliser have to be set up so that the amount of lift and cut is symmetrical, that is, to give $\pm 15\text{dB}$, as opposed to +17, -13, etc. To achieve alignment, follow this procedure:- (all component designation refers to diagrams on pages 57/58.)

1. Set mic amp for minimum gain; feed in a square wave of approximately 500Hz and 0dBm (0.775 volts).
2. Look at the output of the low pass filter (top chop). This will be found at the top of R. 22 - that is, the I.C. 1. side of R. 22, and set the high pass frequency to maximum, so that the square wave is unaffected.
3. Move the oscilloscope to the output of I.C. 2a. This can be found at the top of R. 24, which is the next to the left of R. 22. At this point the signal will have passed through the top chop filter, the treble lift and cut, and the low mid frequency sweep.
4. Observe the wave form and turn the low mid frequency sweep to the approximate centre position. This occurs when the screwdriver slot at the back of the pot is horizontal to the circuit board. Now turn the low mid frequency lift and cut control to the approximate centre position. With a small screwdriver, turn the sweep control backwards and forwards, and see if there is any effect to the wave form - if there is, move the lift and cut control whilst turning the sweep frequency control, until no effect or minimal effect is seen on the wave form.
5. Now adjust the treble lift and cut control for the best square wave response. This should be approximately mechanical centre.
6. Turn the input to sine wave and adjust the level until exactly 0dBm appears at the output of I.C. 2a.
7. Turn the low mid lift and cut control to maximum lift, and adjust the input frequency until a maximum level is obtained. Now adjust V.R. 1. until this level reads +15dBm. Turn the low mid lift and cut back to give 0dBm.
8. Move the oscilloscope to the EQ output, which appears on the negative side of C. 26.

/ Cont.

(n) Sweep EQ Alignment: (cont.)

9. Change the input signal back to square wave and repeat (4), substituting high mid sweep for low mid sweep, and high mid lift and cut for low mid lift and cut.

10. Now adjust the high pass filter (bass chop) to the lowest frequency, that is, minimum effect on square wave, and set the bass lift and cut for best square wave response - which should be approximately mechanical centre.

11. Change the frequency of input signal to approx. 900 Hz and repeat (6 & 7), again substituting high mid for low mid, and V.R. 2 for V.R. 1.

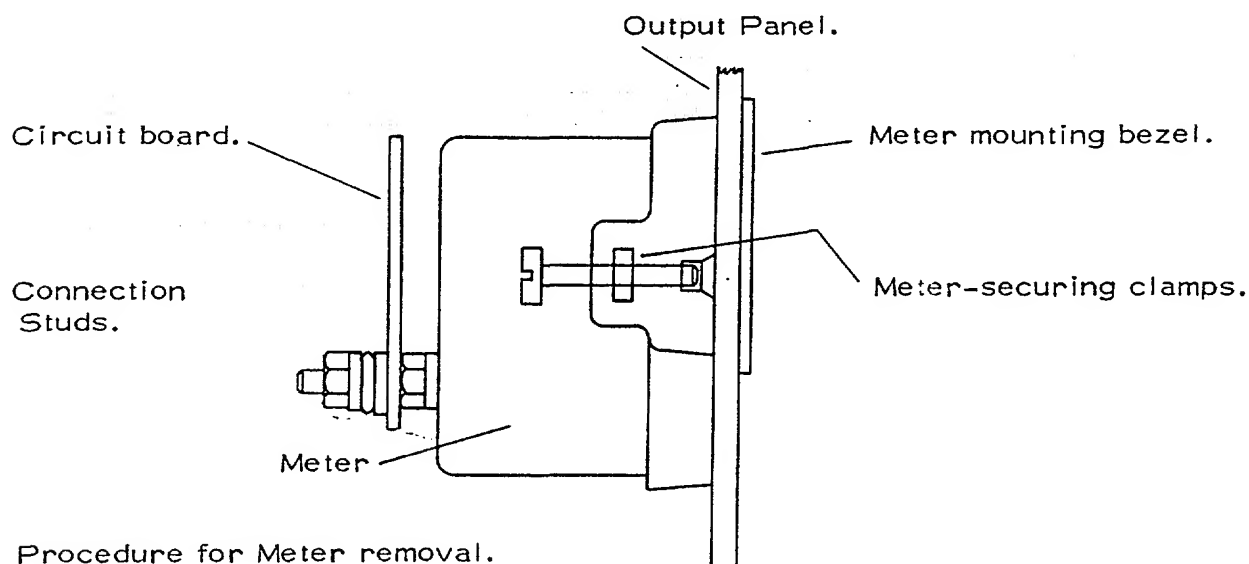
12. The EQ is now aligned. Work through all the controls using a square wave input of 1KHz and 0dBm, and check for correct operation.

SECTION 4. (Cont.)

(o) Replacing a Meter or Bulb:

The meter illumination consists of four 12v bulbs, one for each meter, connected in series across the power lines, or two lots of 4 bulbs for 8 output group mixers. Therefore, if any one bulb goes, it will cause the other three in the row to fail. The failed bulb should be located with a resistance meter. To replace a bulb, follow the instructions for removing VU or PPM circuit boards (Section 4 (i) and (j)). The bulb may now be replaced by undoing the 5mm nuts securing the bulb holder to the rear of the meter - it is not necessary to unsolder the connections.

To replace a meter, it is necessary to remove all the meters to the R.H.S. of the faulty meter - that is, if meter 1 is faulty, meters 4, 3, and 2 have to be removed before meter 1, in that order. Similarly, if meter 5 has to be replaced, meters 8, 7, and 6, have to be removed first. This is because it is virtually impossible to disengage the meter-securing clamps from the mounting bezel unless one side of the meter is accessible. (see diagram).



Procedure for Meter removal.

1. For VU meters, remove circuit board that contains the circuitry of the faulty meter (see Section 4 (i)). For PPMs remove the circuit board of the faulty meter and of all the meters to the R.H.S. (see Section 4 (j)).
2. Remove the illumination from all the meters involved.

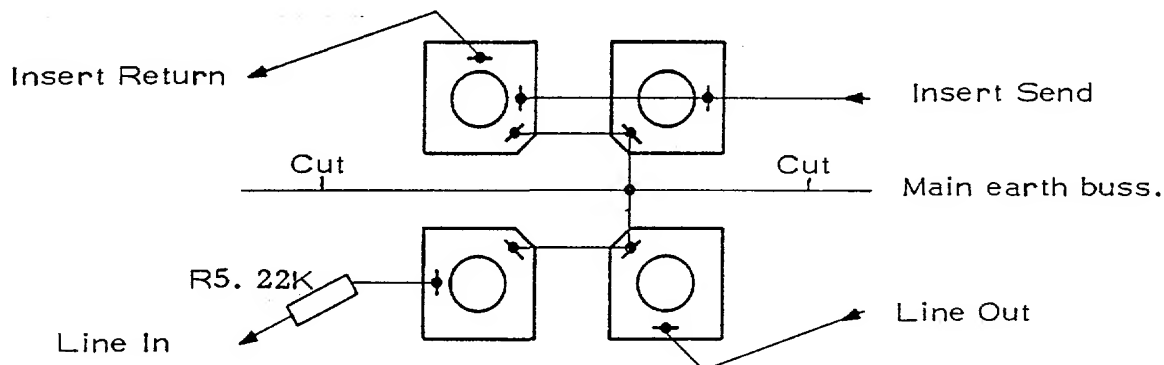
/ Cont.

SECTION 4 (Cont.)

3. Loosen the meter clamp screws of the R.H. meter, ease out the R.H. meter clamp, and push this end of the bezel out from the front of the panel, allowing the meter to be lifted out sideways. The other clamp may then be easily pulled out and the bezel completely removed. Continue this until the faulty meter is reached. The reverse procedure should be followed for re-assembly.

(p) Replacing a jack on the input connector panel:

Each input channel has 4 jack sockets for line input, line output, insert send and insert return, mounted in a tight group and bussed together, making replacement of any one of these very difficult, unless the whole group of 4 is removed. This can be done as follows:-



1. Cut main earth buss on either side of the group of 4 jacks.
2. Undo the 4 nuts securing the jacks to the panel, using a 13mm. Box Spanner.
3. Without unsoldering any leads, lift out the group of 4 jacks.
4. Cut out the faulty jack and replace.
5. Bolt the group of 4 back on to the panel and re-solder the main earth buss.

SECTION 4: (Cont.)

(q) Power Supply - servicing.

The power supply has been kept external to the mixer to eliminate any possibility of hum pick-up from the mains transformer.

The unit contains two independent stabilised supplies, one to provide +40v for powering all the mixer circuits, and the other a +48v supply for phantom powering of condenser mics.

Access to all parts of the power supply is obtained by removing the six pozi-drive screws on the top and either side of the case. The circuit card is plugged in & tied down either with cable ties or nylon string to prevent it working loose when transporting the P.S.U.

The main power supply is short circuit protected, but not the phantom supply. A short between phantom supply and ground will usually cause the 100 Ω resistor R.18 to burn out, leaving the rest of the circuitry unaffected.

A p.s.u. that has developed a fault should first be opened, the circuit card removed, and all the components in the p.s.u. case checked as follows:-

1. Check the 2N3055 transistor TR6, junctions, and check lead-outs for shorts to chassis.
2. Plug in the mains and check the secondaries of the transformers - both should be at approximately 40v A.C.
3. Check the rectified output of the phantom transformer at capacitor C.8. This should be approximately 65v. D.C.

If the 2N3055 shows a fault, it can be replaced simply by unscrewing the two 4BA screws and pulling the transistor out, as it is mounted in a socket. If a fault has been found in either of the transformers or the phantom supply rectifier, replace the defective part, replug the circuit card into the p.s.u. and test either on a mixer or by using external loads of 2K2 $\frac{1}{4}$ -watt for the phantom supply, which should give approximately 46v across this resistor and 32 Ω 50 watt for the main supply. This will provide a test current of 1.25 amps and the voltage across it should be 40v \pm 1v. The ripple level on both supplies should be in the order of 1mv A.C.

However, if a fault has been found on the 2N3055, or no fault found in the p.s.u. body, do not simply replace the transistor - plug in the card & test the supply, as breakdown of one transistor will normally have caused breakdown in one or more of the other transistors and diodes.

SECTION 4: (Cont.)

(q) Power supply servicing (cont.)

With the P.C. board out of circuit make the following checks:-

1. Make resistance checks on all the transistors and diodes. Any transistor that will not turn on or shows a short on any junction should be removed from the circuit and checked again - similarly with diodes.
2. Replace any defective components, and replug the card into the p.s.u. body.
3. Turn on and check the output voltages without a load - these should be $48v \pm 1v$ for the phantom supply and $40v \pm 1v$ for the main supply. If all is well, connect to a load and check again as above. If the output voltages are incorrect, check the D.C. conditions around the circuit against the values given on page 69. Refer to the section on Servicing of Removed P.C. Boards, page 43.

A final test that should be made to a p.s.u. that is apparently functioning correctly, is to short-circuit the 40v supply output for a few seconds and ensure that a complete recovery takes place.

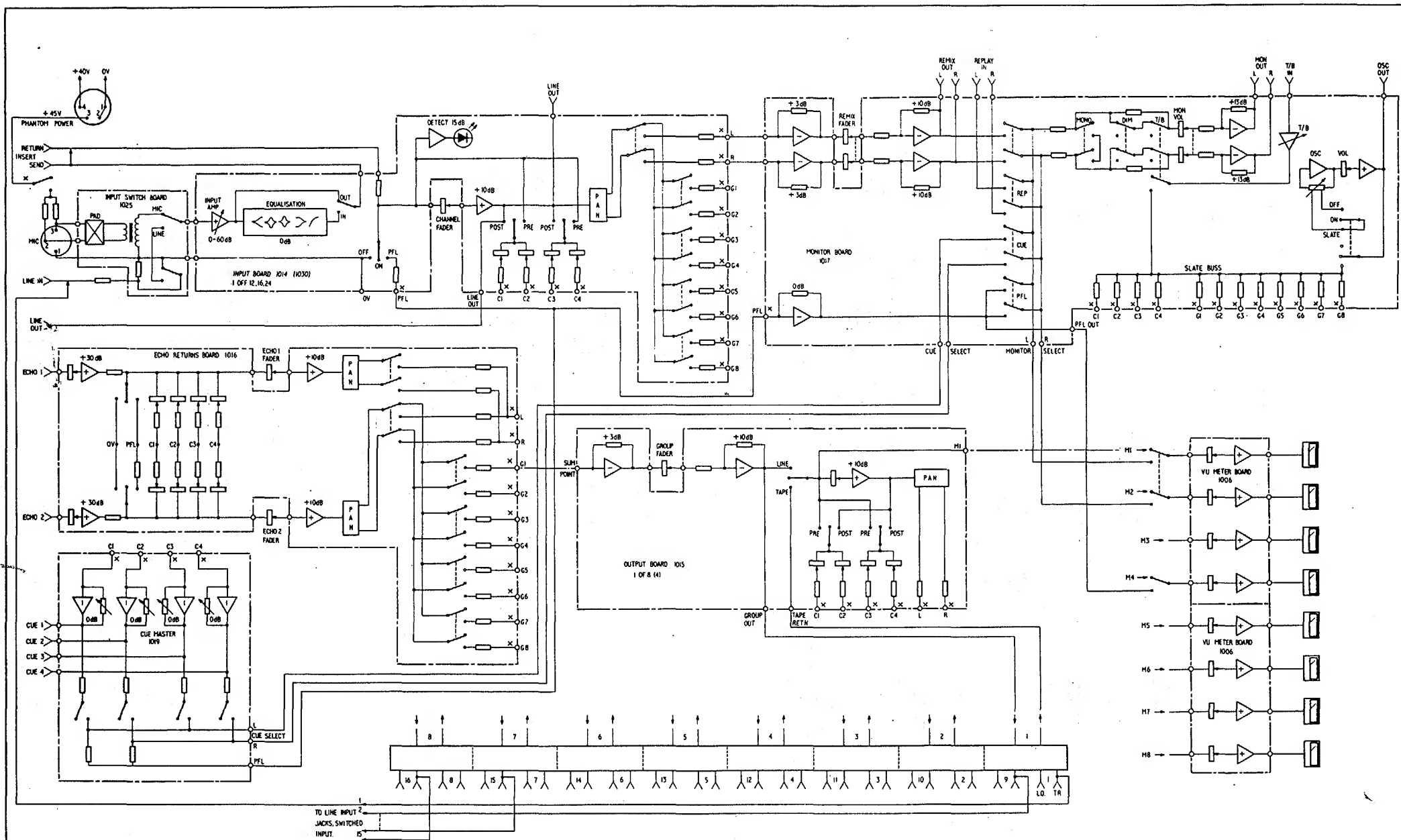
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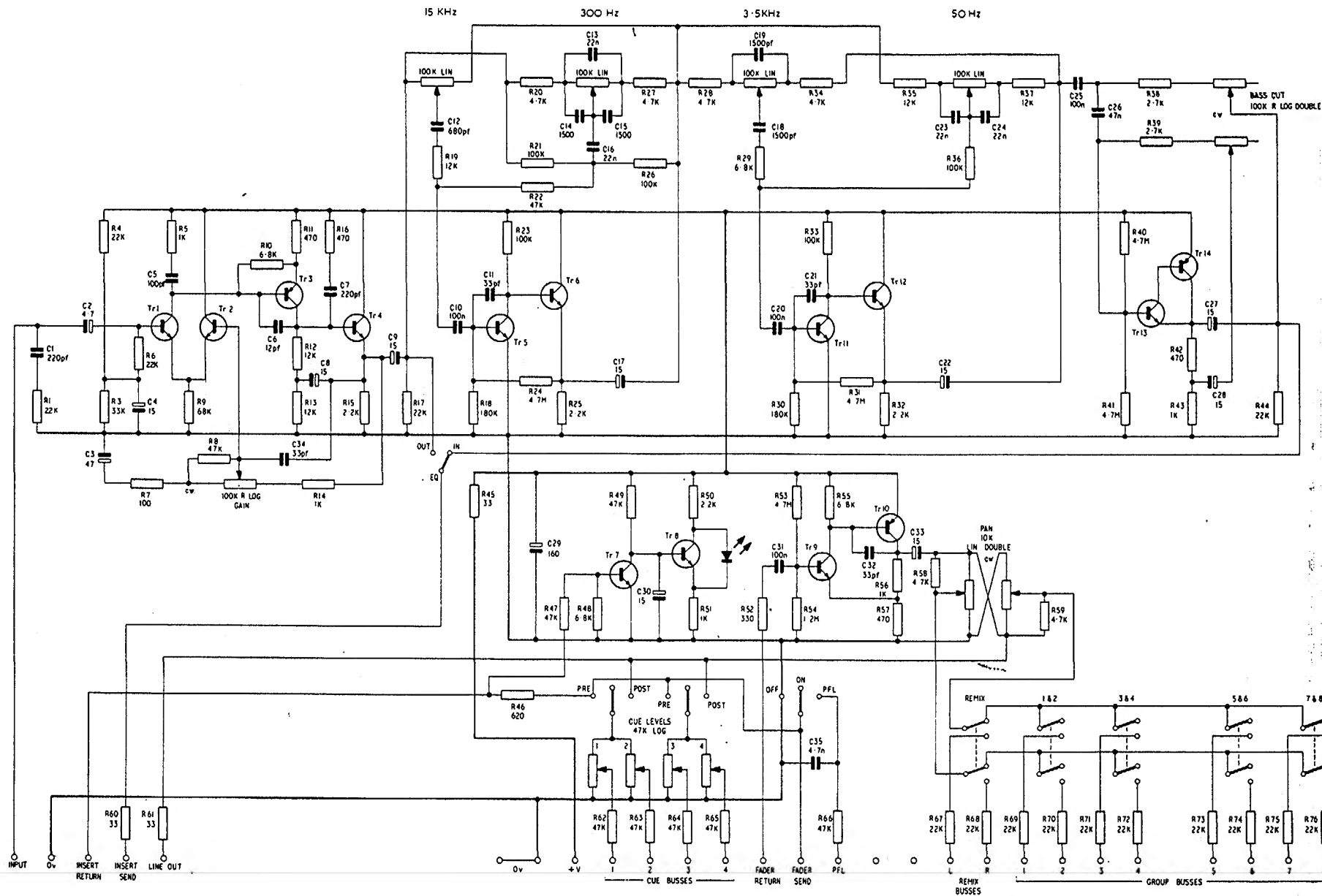
Sub Index.

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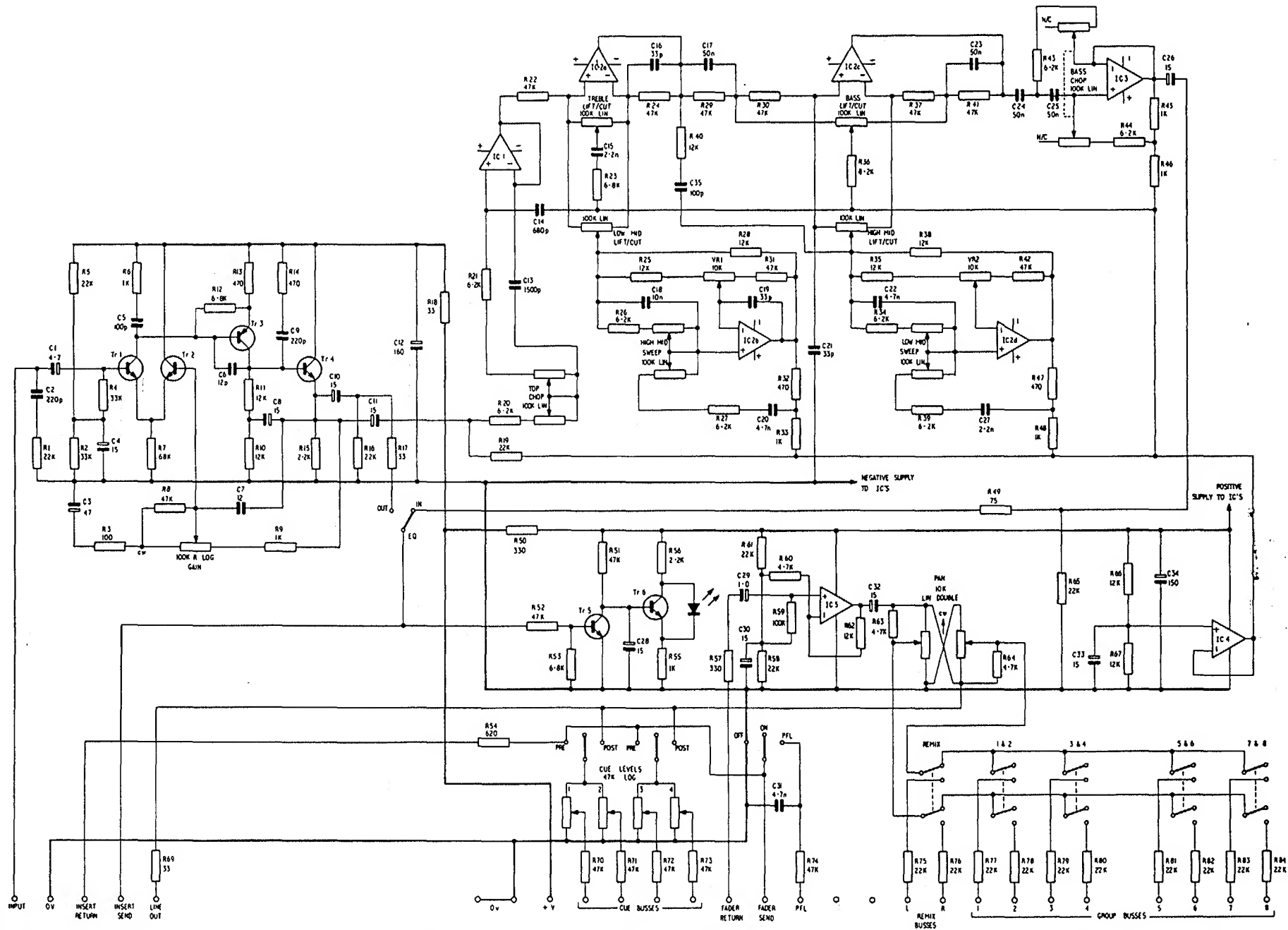
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Sheet 1 of 2		NOTES X DENOTES BUSS BARS LINKING CIRCUIT BOARDS VIA MOTHER BOARD SYSTEM	HOLE INDEX	MATERIAL FINISH SCALE	DRN BN TRCD CHKD	SOUNDCRAFT ELECTRONICS LTD 5-8 GREAT SUTTON STREET LONDON EC1 0BX TELEPHONE 01-251-3631/2/3 TELEGRAMS SOUNDCRAFT LON ECI	TITLE SOUNDCRAFT SERIES II MARK 2 BLOCK DIAGRAM DRG No ED 2008
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<p>Issue 1</p>	<p>NOTES</p> <p>Capacitors in micro farads Resistors in ohms Unless otherwise stated</p>	<p>HOLE INDEX</p>	<p>MATERIAL</p> <p>FINISH</p> <p>SCALE</p>	<p>DRN BN</p> <p>TACD</p> <p>CHKD</p> <p>SOUNDRAFT ELECTRONICS LTD. 5-B GREAT SUTTON STREET LONDON EC1 0BX. TELEPHONE: 01-251-3631/2/3. TELEGRAMS: SOUNDRAFT LON EC1</p>	<p>TITLE</p> <p>SOUNDRAFT SERIES II MARK 2 INPUT BOARD</p> <p>DRG No E3 2006</p>
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Sheet 1
of 3

NOTES

Resistors in ohms
Capacitors in micro farads
Unless otherwise stated

TOLERANCE

All imperial dimensions ± 0.01
All metric dimensions $\pm 0.25\text{mm}$
All angles $\pm 0.50^\circ$
Unless otherwise stated

HOLE INDEX

MATL

FINISH

SCALE

DRN

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TRCD

CMKD

SOUNDRAFT ELECTRONICS LTD

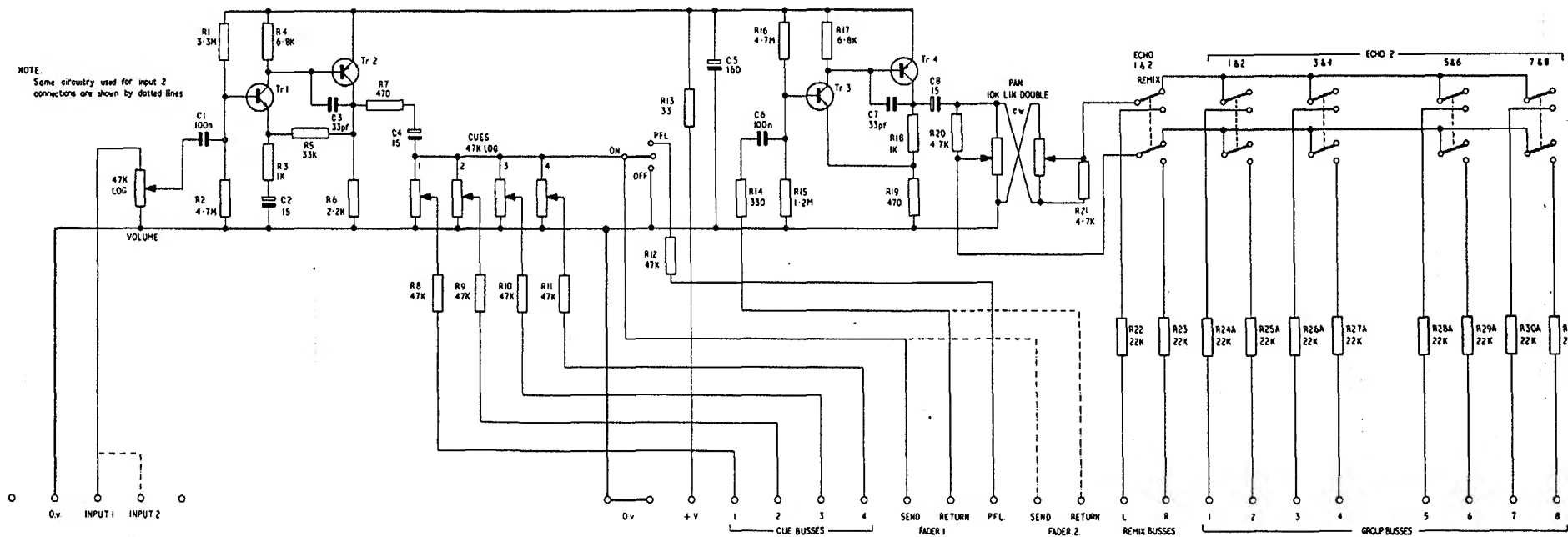
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LONDON EC1 0EL
TELEPHONE: 01-251-3631/2/3
TELEGRAMS: SOUNDRAFT LON EC1
TELEX: UK No. 211908 USA No. 01-2203

TITLE

SWEEP EQUALISATION
INPUT BOARD
SERIES U

DRG No. ED 201

NOTE.
Some circuitry used for input 2
connections are shown by dotted lines



Sheet 1

NOTES.

Capacitors in micro farads
Resistors in ohms.
Unless otherwise stated.

HOLE INDEX.

MATERIAL.

FINISH.

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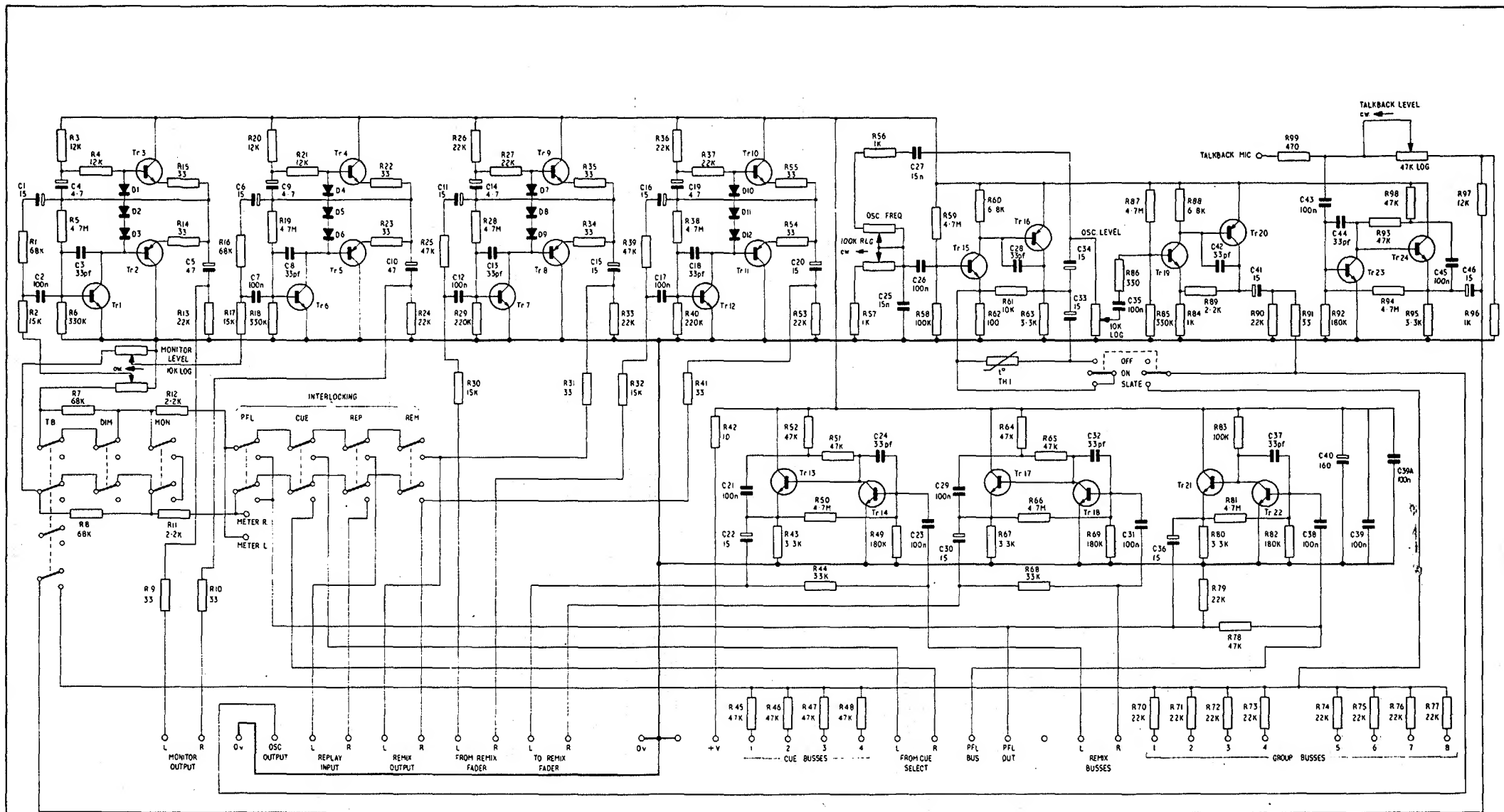
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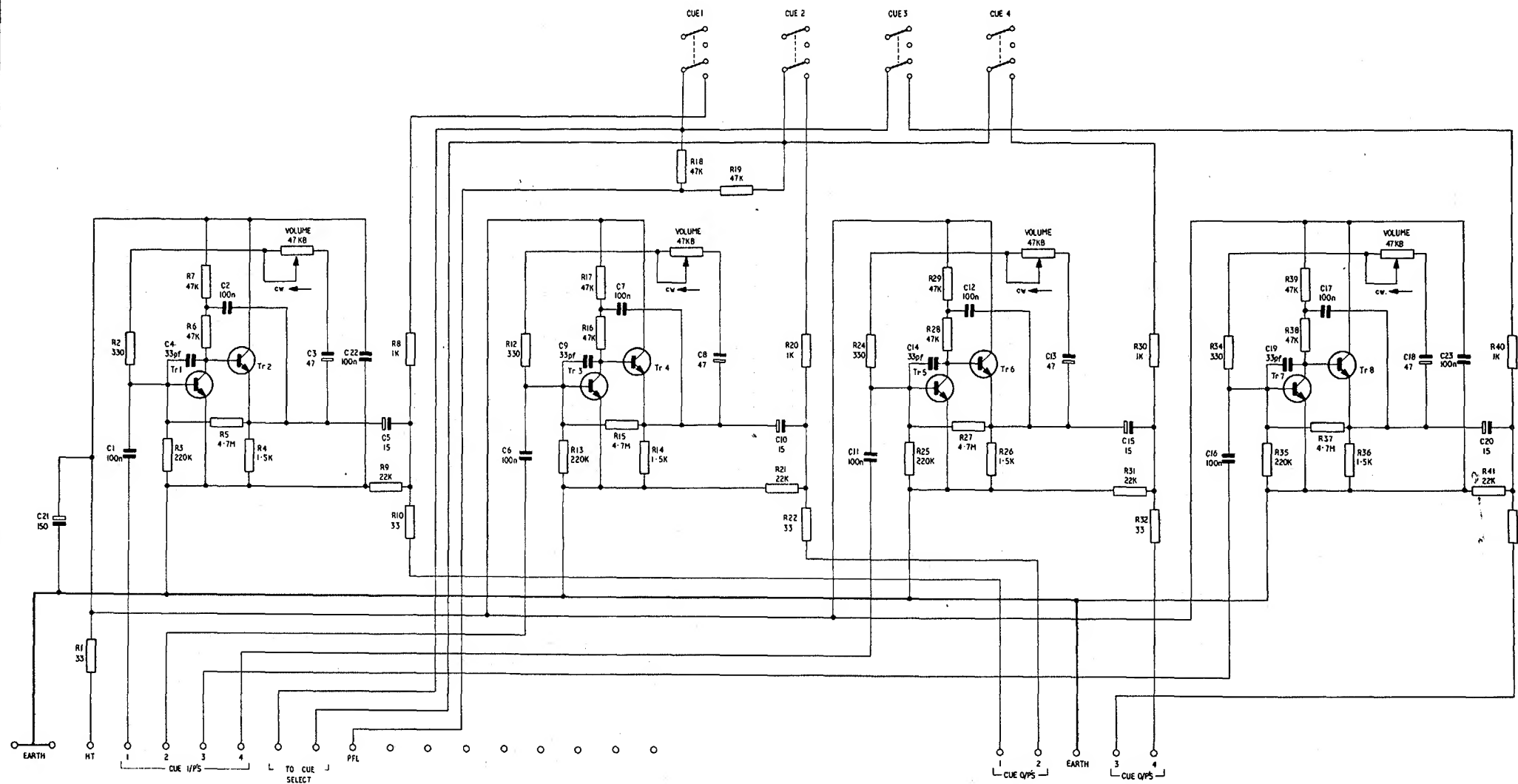
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SOUNDCRAFT ELECTRONICS LTD.
5-8 GREAT SUTTON STREET
LONDON. EC1. 0BK.
TELEPHONE: 01-251-3631/2/3
TELEGRAMS: SOUNDCRAFT LHM. ECI.

TITLE:
SOUNDCRAFT SERIES II MAIN 2
ECHO RETURNS BOARD.
ORG No. 2044



<div> <div>1</div> <div>10mm</div> </div>	<div> <div>NOTES</div> <div>Capacitors in micro farads Resistors in ohms Unless otherwise stated</div> </div>	<div> <div>HOLE INDEX</div> </div>	<div> <div>MATERIAL</div> <div>FINISH</div> <div>SCALE</div> </div>	<div> <div>DRN BN</div> <div>TRCD</div> <div>CMD</div> </div>	<div> <div>SOUNDCRAFT ELECTRONICS LTD 5-B GREAT SUTTON STREET LONDON ECI 0BK TELEPHONE 01-251-3631/2/3 TELEGRAMS SOUNDCRAFT LON ECI</div> <div> <div>TITLE</div> <div>SOUNDCRAFT SERIES II MARK 2 MONITOR BOARD</div> <div> <div>DRG NO</div> <div>2005</div> </div> </div> </div>



Sheet
5-10-76

NOTES.

Capacitors in micro farads
Resistors in ohms
Unless otherwise stated.

HOLE INDEX.

MATERIAL.

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SCALE.

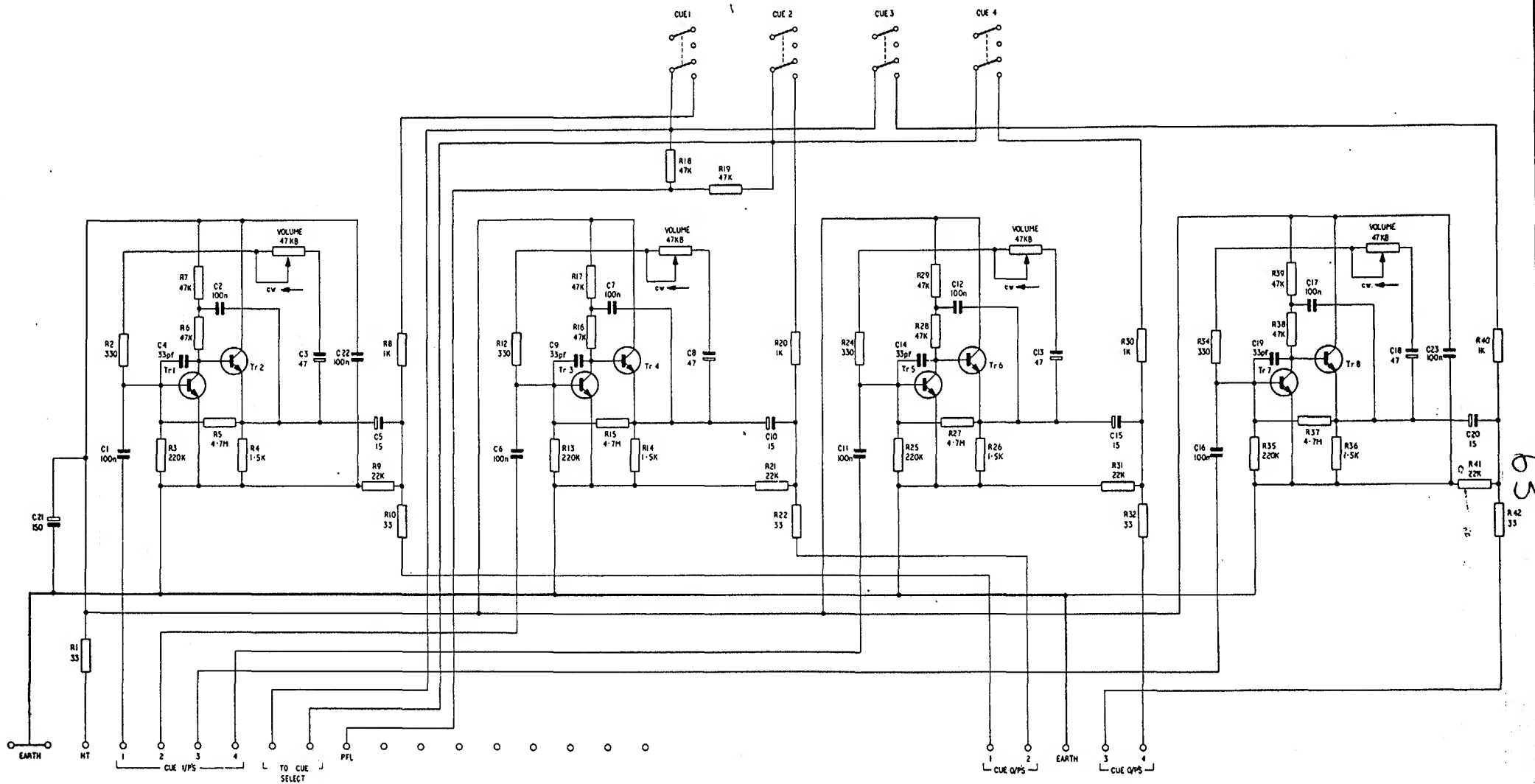
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5-8 GREAT SUTTON STREET
LONDON ECI 6BK.
TELEPHONE 01-251-363/2/3
TELEGRAMS. SOUNDCRAFT LON ECI.

TITLE
SOUNDCRAFT SERIES II MARK 2
CUE'S BOARD.
ORG.No. 2002



Sheet 1 of 2
5-10-76

NOTES.

Capacitors in micro farads
Resistors in ohms
Unless otherwise stated.

HOLE INDEX.

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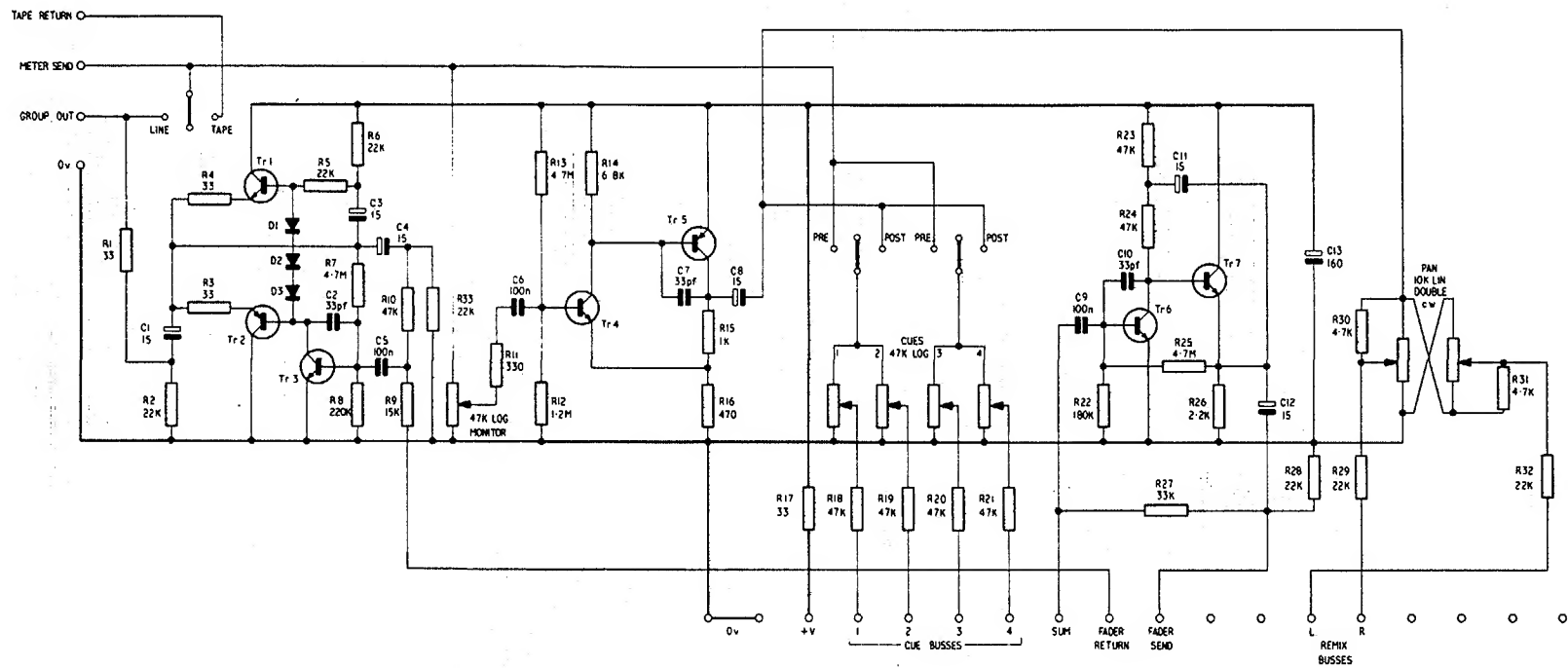
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TELEGRAMS. SOUNDCRAFT LON ECI.

TITLE
SOUNDCRAFT SERIES II MARK 2
CUE'S BOARD.
DRG.No. 20.2002



NOTES.

Capacitors in micro farads
Resistors in ohms
Unless otherwise stated

HOLE INDEX

MATERIAL

FINISH

SCALE

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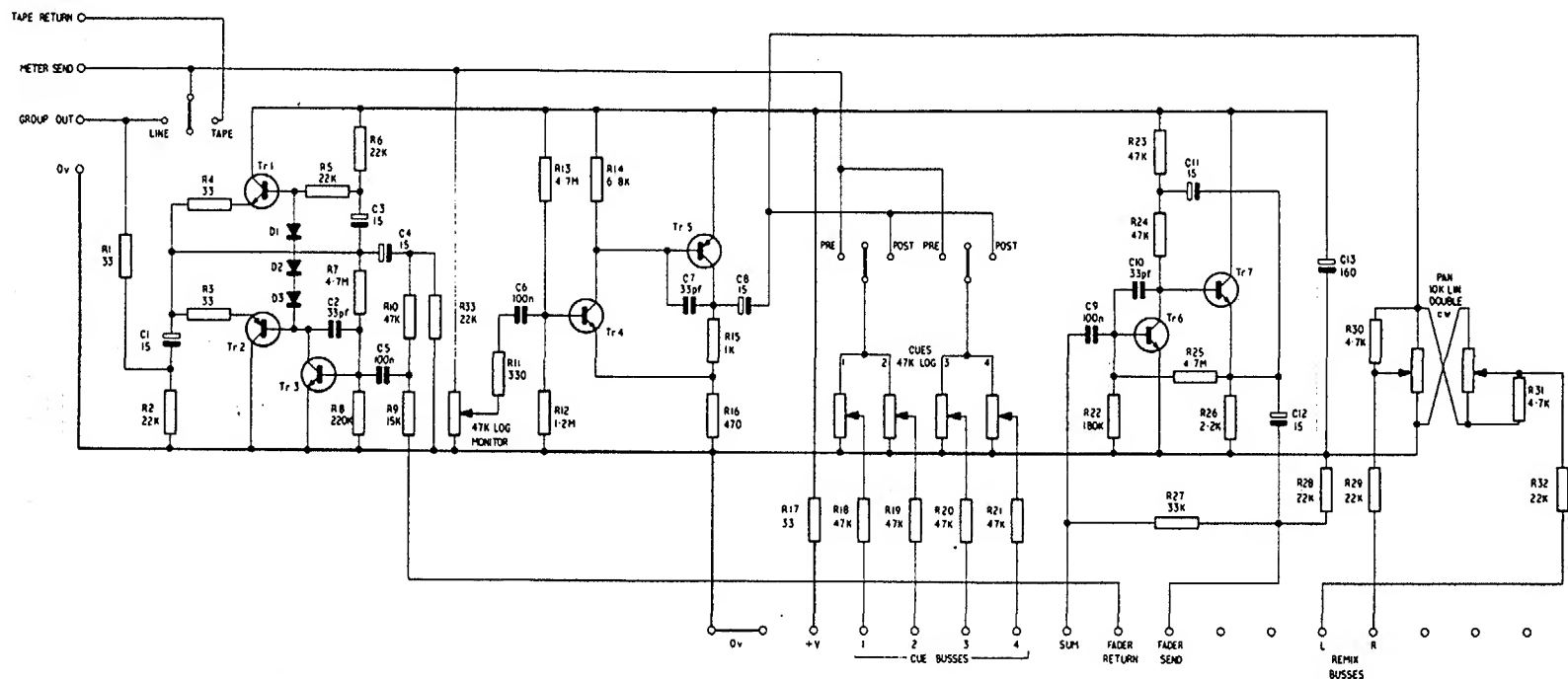
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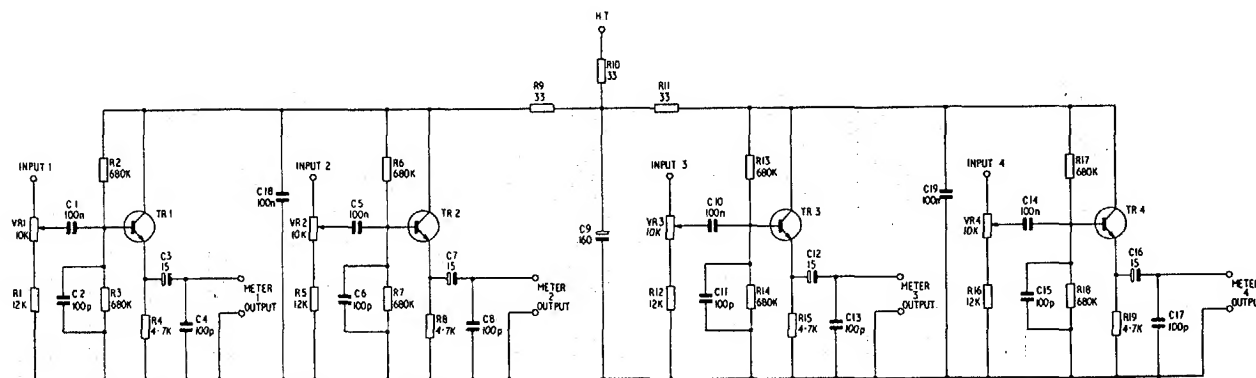
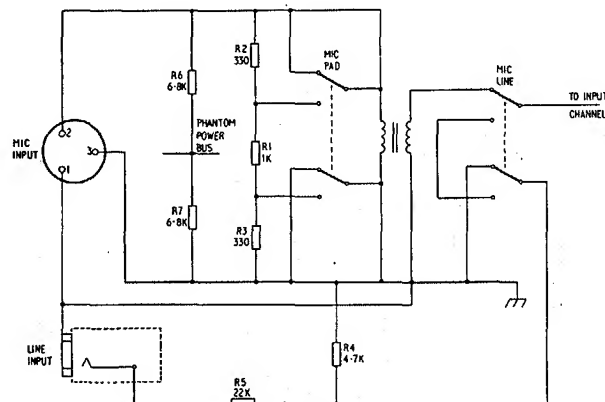
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5-B GREAT SUTTON STREET
LONDON EC1. 0BK.
TELEPHONE: 01-251-3631/2/3
TELEGRAMS: SOUNDCRAFT LON EC1.

TITLE
SOUNDCRAFT SERIES II MARK 2
OUTPUT BOARD.

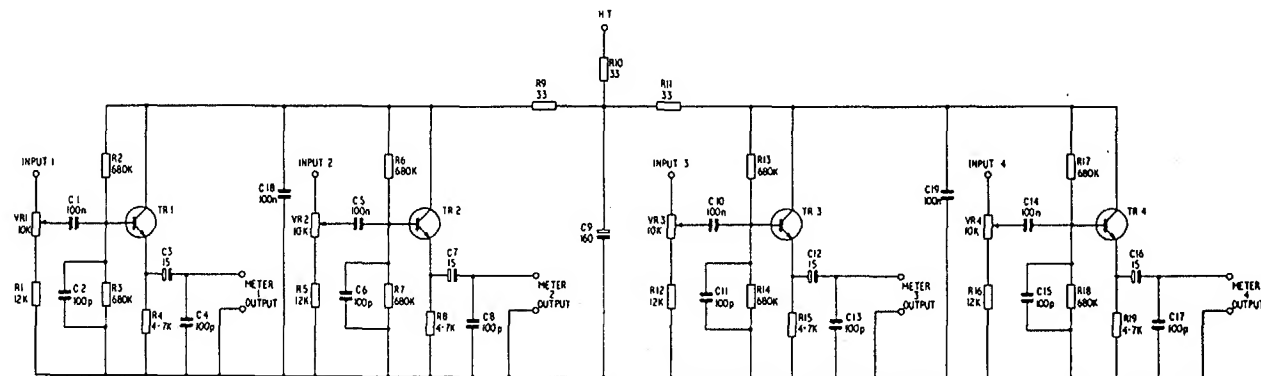
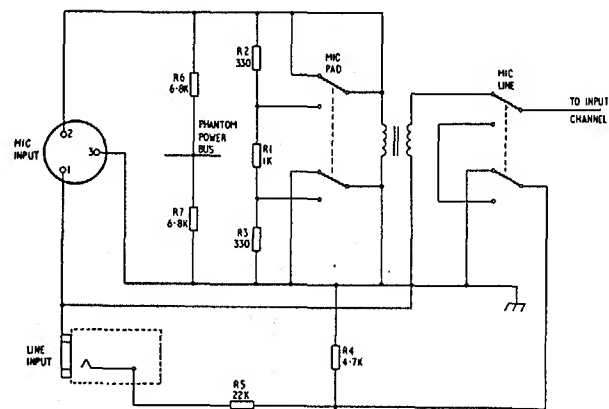
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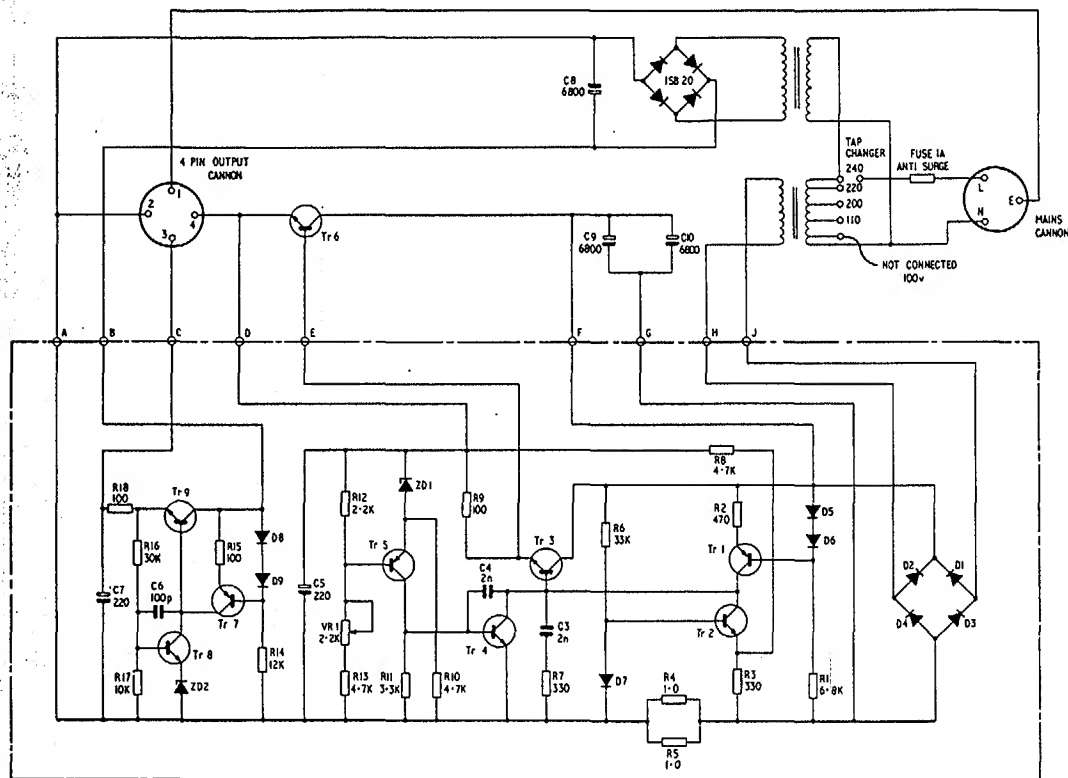
Sheet 1		<p>NOTES</p> <p>Capacitors in micro farads Resistors in ohms Unless otherwise stated</p>	<p>HOLE INDEX</p>	<p>MATERIAL</p> <p>FINISH</p> <p>SCALE</p>	<p>DRH BN</p> <p>TACD.</p> <p>CHKD.</p>	<p>SOUNDCRAFT ELECTRONICS LTD. 5-8 GREAT SUTTON STREET. LONDON EC1. 0BX TELEPHONE: 01-251-3651/2/3 TELEGRAMS SOUNDCRAFT LDN. ECI.</p>	<p>TITLE</p> <p>SOUNDCRAFT SERIES II MARK 2 OUTPUT BOARD.</p> <p>DRG NO. 2003</p>
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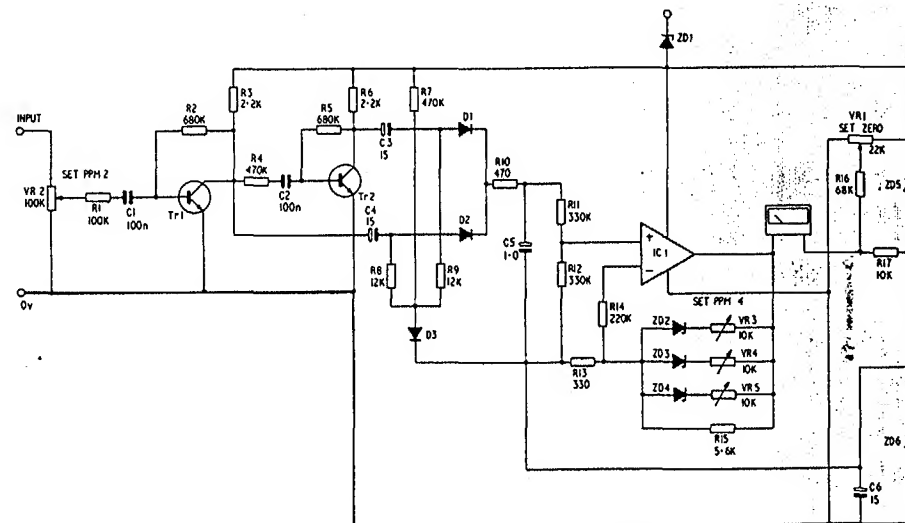
Issue 1 20.2.77		NOTES Resistors in ohms Capacitors in microfarads Unless otherwise stated	TOLERANCE All imperial dimensions ± 0.01 All metric dimensions $\pm 0.25\text{mm}$ All angles $\pm 0.50^\circ$ Unless otherwise stated	HOLE INDEX	MATL	DRN BN	SOUNDCRAFT ELECTRONICS LTD 5-8 GREAT SUTTON STREET LONDON EC1, 6BX. TELEPHONE: 01-251-3631/2/3 TELEGRAMS: SOUNDCRAFT 1 DN EC1 TELEX UK No 21198, USA No 01-2203	TITLE SERIES 11 MARK 2 INPUT SWITCH BOARD & V.U. METER BOARD CIRCUIT DIAGRAMS
					FINISH	TRCD		
					SCALE	CHKD		
DRG. No. ED 2009								



Issue 1 20.2.77		NOTES Resistors in ohms Capacitors in microfarads Unless otherwise stated	TOLERANCE All imperial dimensions ± 0.01 All metric dimensions $\pm 0.25\text{mm}$ All angles $\pm 0.50^\circ$ Unless otherwise stated	HOLE INDEX	MATL	DRN BK	SOUND-CRAFT ELECTRONICS LTD 5-8 GREAT SUTTON STREET LONDON EC1. 6BX. TELEPHONE 01-251-3631/2/3 TELEGRAMS. SOUND-CRAFT LONDON EC1 TELEX. UK No 21108. USA No 01-2203	TITLE SERIES II MARK 2 INPUT SWITCH BOARD & V U METER BOARD CIRCUIT DIAGRAMS
					FINISH	TACO		
					SCALE	CHKD		
DRG. No. EQ 0009								



POWER SUPPLY



PPM CIRCUIT

NOTES

Capacitors in micro-farads
Resistors in ohms
Unless otherwise stated

HOLE INDEX

MATERIAL

FINISH

SCALE

DRN BN

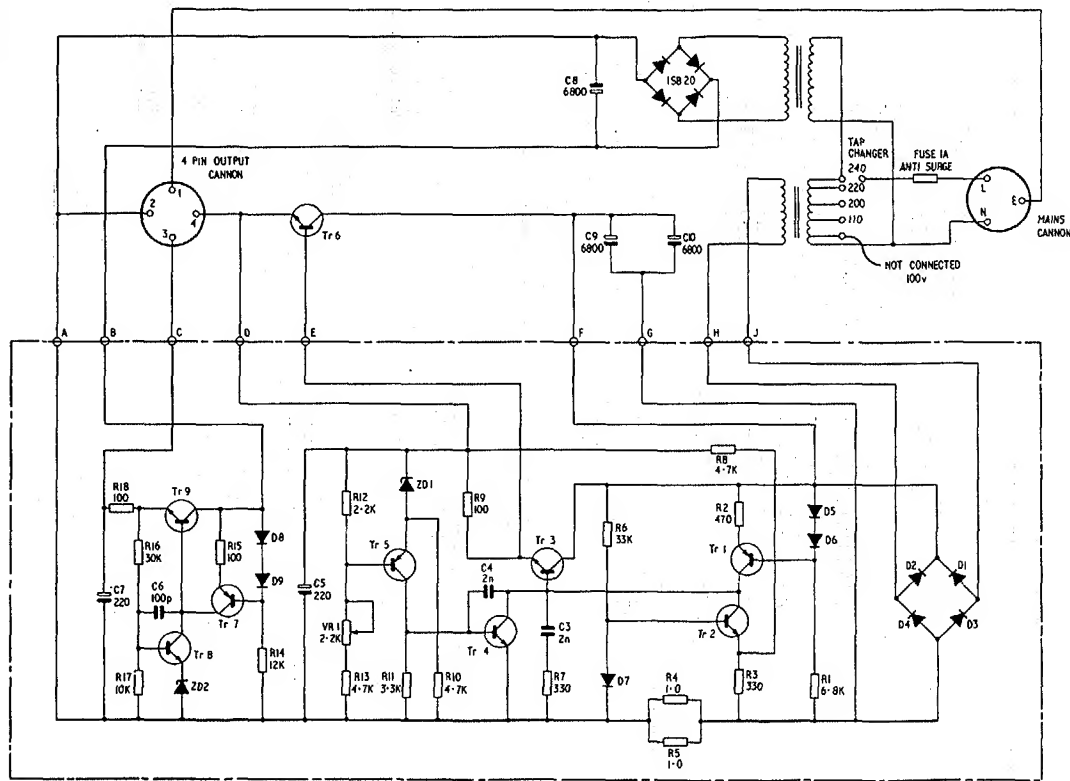
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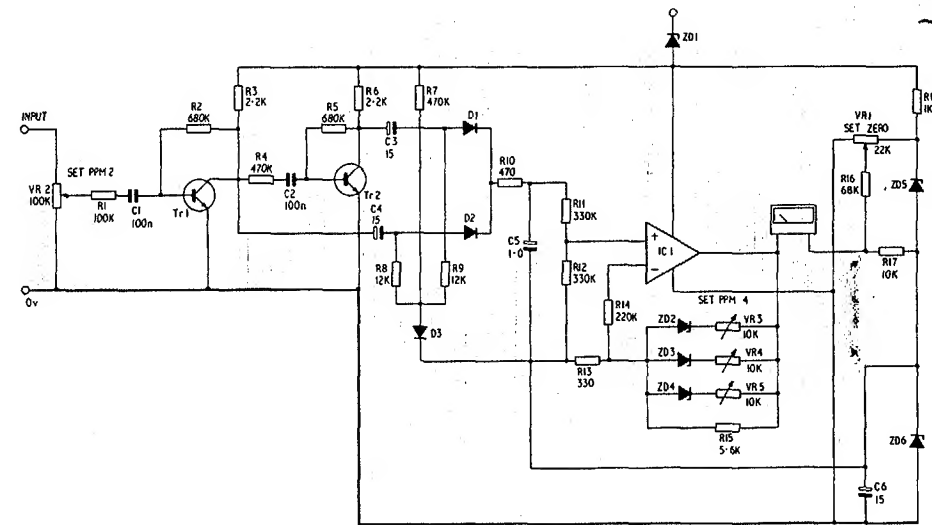
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5-8 GREAT SUTTON STREET
LONDON EC1 0BK
TELEPHONE 01-291-3631/2/3
TELEGRAMS SOUNDCRAFT, LON. EC1.

TITLE
POWER SUPPLY & PPM
CIRCUIT DIAGRAMS

DRG No. ED. 2007



POWER SUPPLY



PPM CIRCUIT

NOTES

Capacitors in micro-farads
Resistors in ohms
Unless otherwise stated

HOLE INDEX

MATERIAL

FINISH

SCALE

DRN BN

TACO

CHKD

SOUNDCRAFT ELECTRONICS LTD
5-8 GREAT SUTTON STREET
LONDON EC1 0BK
TELEPHONE 01-251-3631/2/3
TELEGRAMS SOUNDCRAFT, LON. EC1.

TITLE POWER SUPPLY & PPM
CIRCUIT DIAGRAMS

DRG No ED.2007

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SOUNDCRAFT SERIES TWO PARTS LIST:

RESISTORS STANDARD RANGE.

ALL ISKRA UPM 5% $\frac{1}{3}$ WATT CARBON FILM.

VALUE: PART NO.

10R	SC10000
33R	SC10001
75R	SC10002
100R	SC10003
150R	SC10004
180R	SC10005
330R	SC10006
470R	SC10007
620R	SC10008
820R	SC10009
1K	SC10010
1K6	SC10011
2K2	SC10012
2K7	SC10013
3K3	SC10014
3K9	SC10015
4K7	SC10016
5K1	SC10017
5K6	SC10018
6K2	SC10019
6K8	SC10020
8K2	SC10021
10K	SC10022

VALUE: PART NO.

12K	SC10023
15K	SC10024
18K	SC10025
22K	SC10026
24K	SC10027
33K	SC10028
39K	SC10029
43K	SC10030
47K	SC10031
51K	SC10032
68K	SC10033
100K	SC10034
180K	SC10035
220K	SC10036
330K	SC10037
470K	SC10038
680K	SC10039
1M2	SC10040
1M5	SC10041
4M7	SC10042

SPECIAL RESISTORS.

DESCRIPTION:

PART NO:

330R miniature as used mic pad	SC10500
1K " " " " "	SC10501
Thermistor as used in oscillator.	SC10502
1R 4 watt wire-wound 5% as used in P.S.U.	SC10503

PRE-SETS.

All cermet 10% horizontal 0.2" x 0.4".	SC10504
470R	SC10505
10K	SC10506
22K	SC10507
100K	SC10508

POTENTIOMETERS.

All Radiohm 20% tolerance 20% tracking except
100KA triple whose rear gang is 5% tolerance
5% tracking.

10K log (B) single.	SC10509
10K lin (A) double.	SC10510
10K log (B) double.	SC10511
47K log (B) single.	SC10512
47K log (B) dual concentric.	SC10513
100K reverse log (C) single with mounting bracket.	SC10514
100K reverse log (C) double.	SC10515
100K lin (A)	SC10516
100K lin (A) triple 1+2 dual concentric.	SC10517

FADERS:

Ruwido 10K log single.	SC10518
Ruwido 10K log double.	SC10519
Penny & Giles single.	SC10520
Penny & Giles double.	SC10521

CAPACITORS:

<u>Value:</u>	<u>Tolerance:</u>	<u>Type:</u>	<u>Voltage:</u>	<u>Part No.</u>
12pf	2 %	Ceramic Plate	50v+	SC11000
33pf	10 %	" "	50v+	SC11001
100pf	10 %	" "	50v+	SC11002
220pf	10 %	" "	50v+	SC11003
680pf	5 %	" "	50v+	SC11004
1.5 nf	30 %	" "	50v+	SC11005
1.5nf	10 %	Mylar or polycarbonate	50v+	SC11006
2.2nf	10 %	" " "	50v+	SC11007
4.7nf	10 %	" " "	50v+	SC11008
5nf	10 %	" " "	50v+	SC11009
0.01mf	10 %	" " "	50v+	SC11010
0.022mf	10 %	" " "	50v+	SC11011
0.047mf	10 %	" " "	50v+	SC11012
0.1mf	5 %	" " "	100v+	SC11013
1mf	20 %	Tantalum	35v+	SC11014
4.7mf	20 %	"	35v+	SC11015
15mf		Electrolytic	40v+	SC11016
100mf		"	25v	SC11017
150mf		"	40v	SC11018
220Mf		"	63v	SC11019
6800mf		"	63v	SC11020

SEMI-CONDUCTORS:

TRANSISTORS:

Small signal NPN 2SC 1000 (BL) Toshiba.	SC12000
Small signal PNP 2 SA 493 (GR) Toshiba.	SC12001
Medium power NPN BC 300.	SC12002
Power NPN 2N 3055.	SC12003

DIODES:

Small signal silicon IN 4148.	SC12004
Small signal Germanium OA 91.	SC12005
Rectifier 200 PIV 3A IN 5401.	SC12006
Rectifier bridge 200 PIV 1A 1SB20.	SC12007

SEMI-CONDUCTORS (cont.)

ZENER DIODES BZY88 or ZFP Series 400mW 5%:

PART NO:

3.3v	SC12008
5.1v	SC12009
6.2v	SC12010
11v	SC12011

LIGHT EMITTING DIODE:

Toshiba TLR 104 Red.	SC12012
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INTEGRATED CIRCUITS:

MC1 741 SCP1 op-amp.	SC12013
HA 4741 quad op-amp.	SC12014

SWITCHES:

Toggle:

Single Pole 2 way 2 position.	SC13000
Single Pole 2 way 3 position.	SC13001
Double Pole 2 way 2 position.	SC13002
Double Pole 2 way 3 position.	SC13003
3 Pole 2 way 2 position.	SC13004
Single Pole 2 way 3 position, PCB mounting.	SC13005

Push-Button:

2 Pole 2 way single.	SC13006
Monitor select 4-way switch assembly (interlocking)	SC13007
Cue select 4-way switch assembly (NON-interlocking)	SC13008
4 pole 2 way.	SC13009
Latch mounts 4 way.	SC13010

KNOBS, BUTTONS, CAPS & POINTERS:

<u>Description:</u>	<u>Colour & Markings:</u>	<u>Part No.</u>
$\frac{1}{4}$ " Collet knob unlined.	Black.	SC14000
6mm Collet knob lined.	"	SC14001
4mm Collet knob lined.	"	SC14002
4mm Collet knob lined.	Red	SC14003
$\frac{1}{4}$ " Collet knob cap.	"	SC14005
" " "	Grey	SC14006
" " "	Yellow	SC14007
4mm Collet knob cap.	Blue	SC14008
" " "	Green	SC14009
" " "	Black	SC14010
6mm Collet knob pointer.	Grey.	SC14011
" " "	Green	SC14012
" " "	Blue	SC14013
Push-button switch cap.	Engraved 1-2	SC14014
" " "	Engraved 3-4	SC14015
" " "	" 5-6	SC14016
" " "	" 7-8	SC14017
" " "	" 1	SC14018
" " "	" 2	SC14019
" " "	" 3	SC14020
" " "	" 4	SC14021
" " "	" REM	SC14022
" " "	" REP	SC14023
" " "	" CUE	SC14024
" " "	" PFL	SC14025
" " "	" MON	SC14026
" " "	" DIM	SC14027
" " "	" TB	SC14028

METALWORK:

Description:

Part No.

INPUT PANELS:	Standard 4 track	SC15000
	Standard 8 track	SC15001
	Sweep 4 track	SC15002
	Sweep 8 track	SC15003
OUTPUT PANELS:	4 track	SC15004
	8 track	SC15005
FADER PANELS:	Input 12 channel P & G	SC15006
	Input 12 channel Ruwido	SC15007
	Input 13-24 channel P & G	SC15008
	Input 13-24 channel Ruwido	SC15009
	Input 16 channel P & G	SC15010
	Input 16 channel Ruwido	SC15011
	Output 4 track P & G	SC15012
	Output 4 track Ruwido	SC15013
	Output 8 track P & G	SC15014
	Output 8 track Ruwido	SC15015
TOP SECTION PANELS:		
	Input 12 channel blank	SC15016
	Input 12 channel connector	SC15017
	Input 13-24 channel connector	SC15018
	Input 16 channel blank	SC15019
	Input 16 channel connector	SC15020
	Output blank	SC15021
	Output 4 track jack	SC15022
	Output 8 track Cannon	SC15023
REAR SECTION PANELS:		
	Input 12 channel blank	SC15024
	Input 12 channel connector	SC15025
	Input 13-24 channel connector	SC15026
	Input 16 channel blank	SC15027
	Input 16 channel connector	SC15028
	Output blank	SC15029
	Output 4 track jack	SC15030
	Output 4 track Cannon	SC15031
	Output 8 track jack (o/p-i/p 9-16 only)	SC15032
	Output 8 track jack (o/p-i/p 1-16)	SC15033

METALWORK (Cont.)

Part No.

Transformer Angle Bracket 12 channel	SC15034
" " " 16 channel	SC15035
Aluminium trim strip rear section 6.1"	SC15036
" " " fader section 7.3"	SC15037
" " " top section 4.2"	SC15038
" " " main section 15.5"	SC15039
Bottom Plate 12 channel:	SC15040
" " 16 channel:	SC15041
" " 24 channel:	SC15042
Mixer frame 12 channel:	SC15043
" " 16 channel:	SC15044
" " 24 channel:	SC15045
Power supply case bottom.	SC15046
" " " top.	SC15047.

CONNECTORS:

Mono jack switchcraft N-111 $\frac{1}{4}$ "	SC16000
Mono break-jack switchcraft N-112 $\frac{1}{4}$ "	SC16001
Stereo headphone jack $\frac{1}{4}$ "	SC16002
3-pin chassis-mounting socket female XLP 331 or D3F	SC16003
3-pin " " " male XLP 332 or D3M	SC16004
4-pin " " " male XLR 432 or D4M	SC16005
Mains " " " XLR LNE 32	SC16006
3-pin in line plug female XLR 311C or A3F	SC16007
3-pin " " " male XLR 312C or A3M	SC16008
4-pin " " " female XLR 411C or A4F	SC16009
Mains " " " XLR LNE 11C	SC16010

MOLEX CIRCUIT BOARD CONNECTORS: All 0.2" Pitch:

3-way male	SC16011
3-way female	SC16012
4-way male	SC16013
4-way female	SC16014
5-way male	SC16015
5-way female	SC16016

CONNECTORS: (Cont.)

PART NO.

8-way male	SC16017
8-way female	SC16018
10-way male	SC16019
10-way female	SC16020
12-way male	SC16021
12-way female	SC16022
18-way male	SC16023
18-way female	SC16024
Varelco 56-way chassis-mounting socket male	SC16025
Varelco 56-way in line plug female	SC16026
Contact M100, 100-way chassis-mounting socket male	SC16027
Contact M100, 100-way in line plug female.	SC16028

CIRCUIT BOARDS BLANK:

Standard I/P board.	SC17000
Sweep I/P board.	SC17001
O/P board.	SC17002
Echo board.	SC17003
Cues master board.	SC17004
Input mother board.	SC17005
Mother board link.	SC17006
Output mother board.	SC17007
4-buss mother board for 8-track mixers.	SC17008
Input switch & transformer board.	SC17009
Monitor board.	SC17010
Input connector board.	SC17011
Output connector board.	SC17012
Power supply board with 8-way connector.	SC17013
" " " " 10-way "	SC17014
Power supply connector board, 8-way	SC17015
" " " " 10-way	SC17016
VU meter board.	SC17017
PPM meter board.	SC17018

<u>CIRCUIT BOARDS - BUILT UP:</u>	<u>PART NO.</u>
Standard I/P board.	SC18000
4 standard I/P module including metalwork	SC18001
Sweep I/P board	SC18002
4 sweep I/P module including metalwork	SC18003
Output board	SC18004
Echo board	SC18005
Monitor board	SC18006
Cues master board	SC18007
Input mother board	SC18008
Mother board link	SC18009
Output mother board 4-track	SC18010
Output mother board 8-track	SC18011
4-buss mother board 12-channel.	SC18012
4-buss mother board 16-channel.	SC18013
4-buss mother board 24-channel.	SC18014
Input switch & transformer board 12-channel without transformers.	SC18015
Input switch & transformer board 16-channel without transformers.	SC18016
Input switch & transformer board 24-channel without transformers.	SC18017
Input connector board.	SC18018
Output connector board.	SC18019
Power supply board 8-way connector.	SC18020
Power supply board 10-way connector.	SC18021
Power supply connector board, 8-way connector.	SC18022
Power supply connector board, 10-way connector.	SC18023
VU meter board.	SC18024
PPM meter board.	SC18025

MISCELLANEOUS PARTS:

PART NO.

Mains transformer - 40v 150 VA	SC19000
Phantom supply mains transformer 40v 6VA	SC19001
VU meter	SC19002
PPM meter	SC19003
Meter mounting bezel	SC19004
Meter mounting clamps	SC19005
VU meter light assembly	SC19006
PPM meter light assembly	SC19007
Mic transformer	SC19008
600Ω + 600Ω line output transformer	SC19009
10KΩ + 10KΩ line input transformer	SC19010
Power supply heat sink	SC19011
TO3 Power transistor socket	SC19012
6800 MF 63v capacitor clip	SC19013
Mains lead (Cannon)	SC19014
PSU lead (4-pin/4-pin) XLR 411C	SC19015
Voltage tap selector	SC19016
Wooden side cheek, left.	SC19017
Wooden side cheek, right.	SC19018
Wooden supporting runners	SC19019
Panel securing screws 4BA x $\frac{1}{2}$ " countersunk Allen head	SC19020
Ruwido fader securing screws	SC19021
Penny & Giles " "	SC19022
Mains transformers securing M6 x 12mm Pozi.	SC19023
Side cheek securing $\frac{3}{4}$ " x No 6 Pozi wood screws	SC19024
4BA x $\frac{1}{4}$ " pan head Pozi	SC19025
4BA x $\frac{1}{2}$ " pan head Pozi	SC19026
4BA x $\frac{3}{4}$ " pan head Pozi	SC19027
4BA x $\frac{3}{8}$ " countersunk Pozi	SC19028
6BA x $\frac{1}{2}$ " pan head Pozi	SC19029
8BA x $\frac{1}{2}$ " pan head Pozi	SC19030
4BA nylock nuts	SC19031
4BA starwashers	SC19032
4BA standard nuts	SC19033
4BA plane washers	SC19034

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MISCELLANEOUS PARTS (Cont.)

PART NO.

6BA nylock nuts.	SC19035
6BA standard nuts	SC19036
6BA star washers	SC19037
6BA plane washers	SC19038
8BA standard nuts	SC19039
8BA plane washers	SC19040
Potentiometer nuts	SC19041
Potentiometer washers	SC19042
Pop rivets $\frac{1}{8}'' \times \frac{3}{16}''$	SC19043
4BA solder tags	SC19044
Allen head screwdriver	SC19045
Collet knob spanner	SC19046
P & G knob	SC19047
Ruwido knob.	SC19048
Festoon 12v. Bulbs.	SC19049

SECTION 7:

SUPPLEMENTARY INFORMATION.

- (a) Component and parts Ordering Sheets.
- (b) Warranty Notes.
- (c) Explanation of Abbreviations & Terminology.
- (d) Addenda.

SECTION 7.

(b) INTERNATIONAL WARRANTY & SERVICE POLICY.

Soundcraft product is designed to require the minimum amount of service department attention during its life. All components used are selected for long life, and even with the regular use to which professional equipment is subject, a long life can be expected.

However, it is in the nature of any equipment that a component will become defective from time to time, due to minor defect undetectable on original test, or, in the case of mechanical parts, to wear or damage in use.

Therefore, Soundcraft have evolved the following policy to assist the dealer and protect the owner of Soundcraft equipment:-

1. Importing dealer or distributor will follow test procedure as advised by Soundcraft on arrival of product. Any shipping damage will be reported in writing to Soundcraft, to the airline or shipping agent who last handled the consignment, and to any insurance company which covered the consignment. Any item damaged in transit which cannot be repaired to original standard will be returned to Soundcraft at the cost of the insurers, whose approval should be obtained prior to shipping.
2. Any dealer or distributor of Soundcraft product will have access to a service department competent to service Soundcraft product. The dealer will allow for the labour cost of checking product on arrival, and making any repairs under warranty, in his selling price. Soundcraft will replace any defective component or assembly free of charge within 2 years of sale to the original user (a copy of the original bill of sale should be included with any claim). Dealers and distributors should order any spare parts they require for backup stock. Printed circuit assemblies returned to Soundcraft for repair will be return-mailed within 24 hours.
3. The original owner of Soundcraft product should immediately return the warranty registration card to Soundcraft. Should any claim be made, the claim form should be handed to the supplying dealer. If this is not possible, or if the owner has an in-house maintenance engineer competent to service electronic equipment, the owner should file the claim, indicating what action is required of Soundcraft.

NOTE: As a condition of sale, Soundcraft Electronics Ltd. limits their liability to 2 years free replacement of any component or sub-assembly to be of defective manufacture. All units sold outside U.K. are subject to the agreement made between the purchaser and the supplying dealer as far as warranty labour is concerned.

SECTION 7.

(c) Explanation of Abbreviations and Terminology.

dBm.	Unit of measurement. 0dBm = 1mW into 600Ω, but more normally used to measure voltage levels where 0dBm = 0.775v.
dBv.	Unit of measurement. 0dBv = 1v.
D.M.M.	Digital multi meter.
EQ.	Equalisation.
L.E.D.	Light-emitting diode.
L.H.	Left hand.
L.H.S.	Left hand side.
P.C.B.	Printed circuit board.
PFL.	Prefade listen.
PPM.	Peak Programme Meter. Measured peak voltage levels.
P.S.U.	Power supply unit.
R.F.	Radio Frequency - normally used to describe very high frequency instability.
R.H.	Right hand.
R.H.S.	Right hand side.
Slate.	Refers to the application of a signal to a number of different places.
T/B.	Talkback.
T.H.D.	Total Harmonic Distortion.
Unity.	Usually used in conjunction with gain. Unity means one, therefore Unity Gain means no increase or decrease in level.
V.U.	Volume Unit. Refers to a meter that measures the average level of programme material - which gives an indication of the volume actually heard, rather than the peak voltage level of the programme.

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